AMERICAN

DYESTUFF REPORTER

VOLUME 43 FEBRUARY 1, 1954 NUMBER 3

A PRELIMINARY STUDY OF THE ABRASION RESISTANCE OF FABRICS WHEN TEST UNITS OF ABRASION ARE COMBINED WITH TEST UNITS OF LAUNDERING, DRYCLEANING AND LIGHT

MARGARET O ZOOK
State College, Pennsylvania

and

PAULINE BEERY MACK
College of Household Arts and Sciences
Texas State College for Women

INTRODUCTION

TEXTILE technologists have attempted to develop tests which, they hoped, would predict the service to be expected from a fabric, even when the tests are applied separately for such factors as response to light exposure, laundering, drycleaning, gas fading, heat, abrasion, and perspiration.

This has not been entirely successful because each test is run on specimens of new fabric with results differing from those while the fabric is in use. In the laboratory tests now generally applied, such agencies as those named above are applied separately to new test swatches, while in actual usage these agencies affect the fabric alternately or several at a time.

Research workers co-operating with the second-named author long have held to the philosophy that an integrated test involving the major destructive factors can be developed which will show a satisfactorily close relationship with the type of wear resulting from fabrics in service and in storage.

It was with this end in view that a series of investigations have been conducted for the purpose of developing composite accelerated aging tests in which several destructive agents were combined for use in predicting the durability of wearing apparel in household textiles.

SCOPE OF PROBLEM——Preliminary combinations of abrasion with light, laundering, and drycleaning test units have been investigated in the following combinations:

A. (1) abrasion alone
   (2) abrasion followed by light
   (3) light followed by abrasion
   (4) light alone

This is the seventh in a series of reports on methodology studies related to the testing of textile fabrics under the sponsorship of the American Viscose Corporation. The study was conducted while the second-named author was director and the first a research worker in the Ellen H Richards Institute, School of Chemistry and Physics, The Pennsylvania State University.

B. (1) abrasion alone
   (2) abrasion followed by laundering
   (3) laundering followed by abrasion
   (4) laundering alone

C. (1) abrasion alone
   (2) abrasion followed by drycleaning
   (3) drycleaning followed by abrasion
   (4) drycleaning alone

METHOD OF PROCEDURE

FABRICS —— Six experimental fabrics representing a variety in weight and construction as well as in colorfastness were used in the study. They consisted of the types shown in Table I, and they were, respectively, Fabric Numbers 3, 5, 6, 8, 9, and 11 as described for weight and mechanical construction in the second report of this series by Zook (7).

Four fabrics, (3, 6, 9, and 11), were exposed to combinations of abrasion and light; and all six experimental fabrics were exposed to abrasion combined, respectively, with laundering and with drycleaning.

TEST UNITS——(1). A unit of light as developed by Lyle *(4, 5)* consisted of ex-

TABLE I
EXPERIMENTAL FABRICS

Fabric Number	*Type of Fabric*	*Fiber Content*	*Dye Type*
(3)	blue print dull luster taffeta of viscose filament yarn weighing 2.6 ounces per square yard	100% viscose	**Background** blue—direct **Printed Design** rose—anthraquinone vat green—anthraquinone vat yellow—thioindigoid vat black—thioindigoid vat gray—thioindigoid vat
(5)	cream fuji of filament viscose warp and spun viscose filling yarns weighing 3.4 ounces per square yard	100% viscose	
(6)	blue gabardine of spun viscose weighing 4.6 ounces per square yard	100% viscose	Direct
(8)	satin lining of viscose rayon weighing 5.2 ounces per square yard	100% viscose	
(9)	red salyna of cotton and spun viscose weighing 5.6 ounces per square yard	21.9% cotton 78.1% viscose	Diazo and Developed
(11)	tackletwill of filament viscose warp and a two-ply cotton filling weighing 6.2 ounces per square yard	44.6% cotton 55.4% viscose	

TABLE II

PERCENTAGE OF BREAKING STRENGTH LOSS WITH TEST UNITS OF ABRASION IN COMBINATION WITH LIGHT, LAUNDERING, AND DRYCLEANING

Abrasion Direction and Fabric Number	*Untreated (Average strength)*	*After Abrasion*	*After Light*	*After Abrasion followed by Light*	*After Light followed by Abrasion*	*After Laundering*	*After Abrasion followed by Laundering*	*After Laundering followed by Abrasion*	*After Drycleaning*	*After Abrasion followed by Drycleaning*	*After Drycleaning followed by Abrasion*
Abraded Parallel to Warp											
(3)	15.09	68.79	28.24	55.80	81.97	+7.09	58.58	74.95	+6.89	59.84	76.21
(5)	23.66	60.95				3.04	71.81	61.41	2.54	73.71	70.00
(6)	42.13	64.09	11.65	52.79	46.48	11.65	64.25	46.66	+6.22	63.89	80.56
(8)	52.78	65.84				0.17	60.04	43.80	3.15	62.52	58.85
(9)	28.87	41.66	+5.16	23.35	31.00	25.13	16.42	17.64	10.60	46.52	48.04
(11)	29.78	76.06	8.50	71.56	71.16	5.47	81.90	48.43	2.22	92.01	82.37
Abraded Crosswise to Warp											
(3)	48.00	29.81				0.85	41.31	25.65	2.79	56.12	36.71
(5)	33.50	42.15	33.58	39.55	48.42	+2.33	33.10	43.01	+10.45	33.67	47.94
(6)	80.13	43.22	13.27	43.77	72.02	2.18	58.36	40.33	+9.82	65.99	71.92
(8)	109.75	48.43				111.00	58.00	57.38	99.75	50.00	49.50
(9)	53.87	5.03	+3.90	5.25	0.58	0.84	15.31	10.19	3.25	11.19	5.33
(11)	70.56	65.28	8.23	63.78	69.01	5.23	77.08	58.19	2.21	83.43	81.39
Abraded Parallel to Filling											
(3)	18.87	54.74				8.43	55.80	40.38	6.68	64.92	59.6.
(5)	18.88	67.32	27.65	83.79	86.76	+13.88	74.73	73.52	+8.47	68.64	72.83
(6)	20.69	0.72	6.19	16.82	18.03	4.35	5.56	8.59	+8.75	3.14	14.60
(8)	24.06	14.46				2.58	4.07	+0.71	9.85	7.69	9.94
(9)	18.69	69.23	+7.87	47.67	46.98	3.32	72.55	55.38	4.71	70.57	53.61
(11)	33.66	1.22	1.09	4.31	4.81	35.62	34.76	35.79	6.68	3.21	6.65
Abraded Crosswise to Filling											
(3)	38.31	24.85				4.80	25.29	6.79	1.46	27.77	26.76
(5)	42.81	45.01	27.38	61.08	63.30	+1.17	43.05	29.43	+5.46	51.62	54.00
(6)	37.25	2.90	10.95	11.41	14.00	4.00	12.75	7.38	+10.28	2.47	3.11
(8)	41.75	7.50				3.59	5.80	0.60	9.29	8.57	9.00
(9)	41.16	45.67	+0.61	21.74	24.00	6.17	59.60	41.47	11.25	62.34	26.04
(11)	63.25	6.20	2.18	6.84	12.05	7.91	13.72	+3.56	13.42	13.83	19.10

posure in the accelerated light cabinets built under her direction with a temperature controlled between 145° to 150°F and a relative humidity of 35 to 55 percent in an oxygen atmosphere. The six fabrics were exposed on the drum, each covering one-sixth of the drum, for a total period (for all fabrics) of 300 hours.

(II). A unit of laundering as developed by Keeney (5) consisted of laundering in the especially designed one-gallon metal wash cans which she has designed, using the following conditions:

temperature 180°F;
pH 11.5;
soap solution 0.2 per cent;
trisodium phosphate five grams per liter;
22 steel balls of one-half inch size and one liter of water to one-fourth pound of fabric.

(III). A unit of drycleaning as developed by Ream (6) consisted of five drycleanings, using the Commercial Standards CS59-44 procedure with Stoddard solvent.

(IV). A unit of abrasion as suggested by Zook *(8)* consisted of applying CS 10 calibrase wheels, using 500-gram weights on the Taber abraser, approximately until a 60 percent breaking strength loss had occurred in the direction of greatest strength loss. This required cycles as follows:

Fabric (1) fuji 45
Fabric (2) blue twalle 32
Fabric (3) blue gabardine 150
Fabric (4) satin lining 75
Fabric (5) red salyna 250
Fabric (6) tackletwill 450

EVALUATION —— Nine test swatches were used for each combination, eight to be reserved for strength tests and one for color evaluation. The total number required for the test was cut and mixed in a box before stacking; this was for the purpose of producing random sampling.

(I). *Breaking Strength.* Samples were cut and tested as previously described by Zook (7) so that there were eight strips abraded parallel to the warp yarns and eight parallel to the filling. In addition eight tests were abraded crosswise to each of the warp and filling yarns. Strips were frayed to their original thread count. Results were averaged and the percentage loss in strength was calculated and graphed in their various relationships.

(II). *Colorfastness.* The Commercial Standard CS59-44 methods for evaluating colorfastness to light, laundering, and drycleaning were used, and the colors were rated according to the rating scale employed in this series of studies, to determine the degree of fading by visual examination which could be discerned, using the following classifications:

(1) no perceptible fading;
(2) slight fading;
(3) noticeable fading;
(4) severe fading.

Samples of each major color and numerous shades, faded to the four degrees, were used for comparative purposes to reduce subjectivity. The colors were matched as described by Borton, *et al (1)*.

PRESENTATION OF DATA

Percentage of breaking strength changes in the four abrasion and test directions resulting from exposure to the agents described are tabulated in Table II, and shown graphically in Figures 1, 2 and 3. Color change gradings are shown in Table III.

DISCUSSION OF FINDINGS

It should be noted, first of all, that this is only a preliminary investigation of the destructive action on the experimental fabrics caused by abrasion, light, laundering, and drycleaning; each agency was used alone and abrasion was used with the others in combinations as described. The study had for its purpose the suggestion of a procedure for further investigation, using various combinations of these agencies. For this reason, the effect of each agent on the abrasive resistance of the individual fabrics shall be discussed.

STRENGTH——In order to determine the percentage difference in strength which should occur before a difference should be regarded as significant, statistical differences were computed for the various tests. It was found that a difference ranging from eight to 15 percent was insignificant at the one percent level; a difference of 10 percent was not significant; but greater differences were significant at the five per-

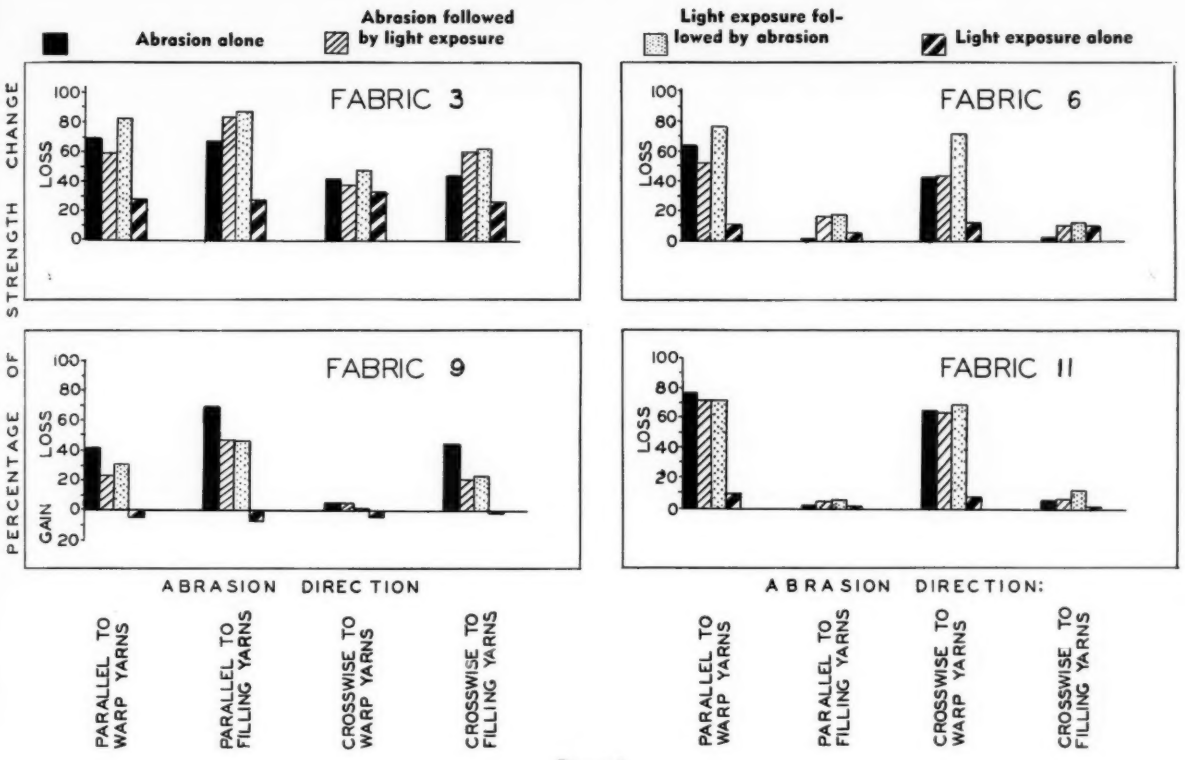


Figure 1

Change in breaking strength of specified fabrics resulting from a combination of the application of test units of abrasion and alternate exposure to light.

cent level. This difference, therefore, was recognized as insignificant, and anything above that as significant.

Only Red Salyna showed an increase in strength from exposure to light alone. Since breaking strength tests were performed on strips ravelled to the original thread count, this can be explained only by the slight shrinkage that took place in the fabric when exposed to the test unit of light, which placed the yarns in a closer relationship. This increase was less than 10 percent in each case, however, and hence it was not regarded as significant even though it always proceeded in the same direction.

In all four fabrics there either was less, or at least no more, loss in breaking strength in the warp direction when the fabrics were exposed to abrasion followed by light than when subjected to abrasion alone, although in the filling direction of the Blue Taffeta and of the Blue Gabardine, there was a greater strength loss in this combination than when light was omitted. In the Blue Taffeta and Blue Gabardine, there also was a greater loss from exposure to light followed by abrasion than from abrasion alone, both in the warp and filling directions. It would appear that the significant loss shown in breaking strength by exposure to light caused a chemical deterioration of the fabric, which made it less resistant to abrasive action in these cases.

Since the Red Salyna showed an apparent, although insignificant, increase in strength when exposed to light alone, the decrease in strength loss shown with the abrasion and light combinations below that from abrasion alone was expected.

The strength changes in Tackletwill *B* samples from abrasion alone and from combinations of abrasion and light were within a 10 percent range, and hence were considered insignificant. It would appear that neither a chemical nor a physical change took place in the fabric when exposed to light in this case.

ABRASION AND LAUNDERING—— Both the Blue Taffeta and the Tackletwill *B* fabrics used in the study showed increases in strength in all directions as a result of laundering, which probably was due to a slight shrinkage produced on both fabrics which tended to bind the threads more closely together, even though the number of threads per test breaking strength strip was held constant for each fabric. Since the gain was under the 10

TABLE III

COLOR CHANGES OF EXPERIMENTAL FABRICS UNDERGOING TEST UNITS OF ABRASION WITH LAUNDERING, DRYCLEANING, AND LIGHT

Fabric	Color Change Rating									
	After Abrasion alone	*After Laundering alone*	*After Abrasion followed by Laundering*	*After Laundering followed by Abrasion*	*After Drycleaning alone*	*After Abrasion followed by Drycleaning*	*After Drycleaning followed by Abrasion*	*After Light alone*	*After Abrasion followed by Light*	*After Light followed by Abrasion*
Blue Taffeta	3	4	4	4	2	3	3	4	4	4
Fuji	1	1	1	1	1	1	1			
Blue Gabardine	2	1	2	2	1	2	2	4	4	4
Satin Lining	3	4	4	4	1	3	3			
Red Salyna	2	1	2	2	1	2	2	1	2	2
Tackletwill B	3	3	3	3	1	3	3	1	3	3

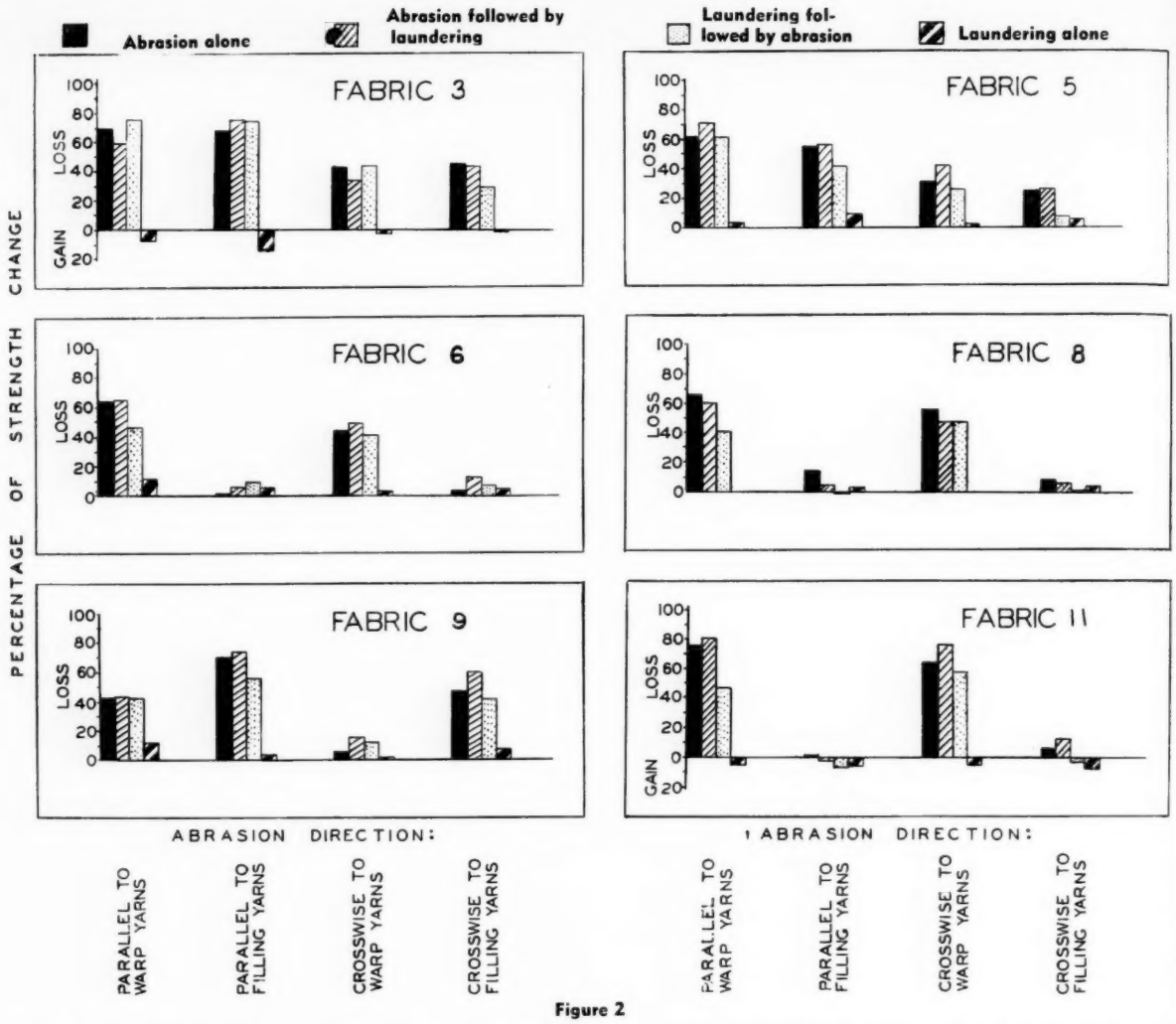


Figure 2

Change in breaking strength of specified fabrics resulting from a combination of the applications of test units of abrasion alternated with laundering.

percent limit established as the borderline of significance, this was considered an insignificant difference. It would appear, however, since all tests with these fabrics varied in the same direction, that the shrinkage factor may have been operative.

In many of the cases, the breakdown in strength from laundering followed by abrasion was less than that from abrasion followed by laundering. In most cases, this is believed to be due to shrinkage. In the cases of the Satin Lining and Tackletwill a smoother surface caused by a change produced in the finish by the laundering test unit undoubtedly played a part. Changes in the hand of the fabrics from laundering also was a probable influencing factor, since it was noted, especially with the Red Salyna and Fuji, that the fabrics became softer after washing. With the Blue Dull Luster Taffeta, a stiffer hand was apparent.

Removal of finishes, which either may protect the fabric or make it more resistant to abrasion, plays a part in the findings. In some cases, the finish instead of being removed, may be changed in composition so that a smoother surface on the fabric reduces susceptibility to abrasion. In some cases the fabric becomes softer or stiffer depending on the finish used.

Kaswell (2) refers to the non-inherent properties of a fabric as *form factor* or *fabric geometry*. This form factor includes such characteristics of a fabric as yarn size, twist, diameter; fabric weave; picks and ends per inch; percent warp or filling yarns on the surface; and float length. Changes in the form factor due to shrinkage, stretching, or removal of finish undoubtedly change the relationship of yarns to one another and, hence, change the resistance of the fabric to abrasion. In addition to this change, the elongation of the fabric may be affected so that, when the fabric is mounted on the turntable after treatment with the agencies mentioned, further changes in the *form factor* may be brought about.

For these reasons, not only is the general resistance of a fabric to abrasion changed, but also the abrasion resistance of a fabric in its different abrasion and test directions is changed. In certain cases, the increase in abrasive resistance due to change in form factor may counterbalance any decrease in abrasion resistance from chemical breakdown.

Laundering of abraded samples gave strength results which resembled somewhat closely the loss in strength from abrasion alone, since results of the two agencies combined in the order of abrasion and then laundering gave strength losses which

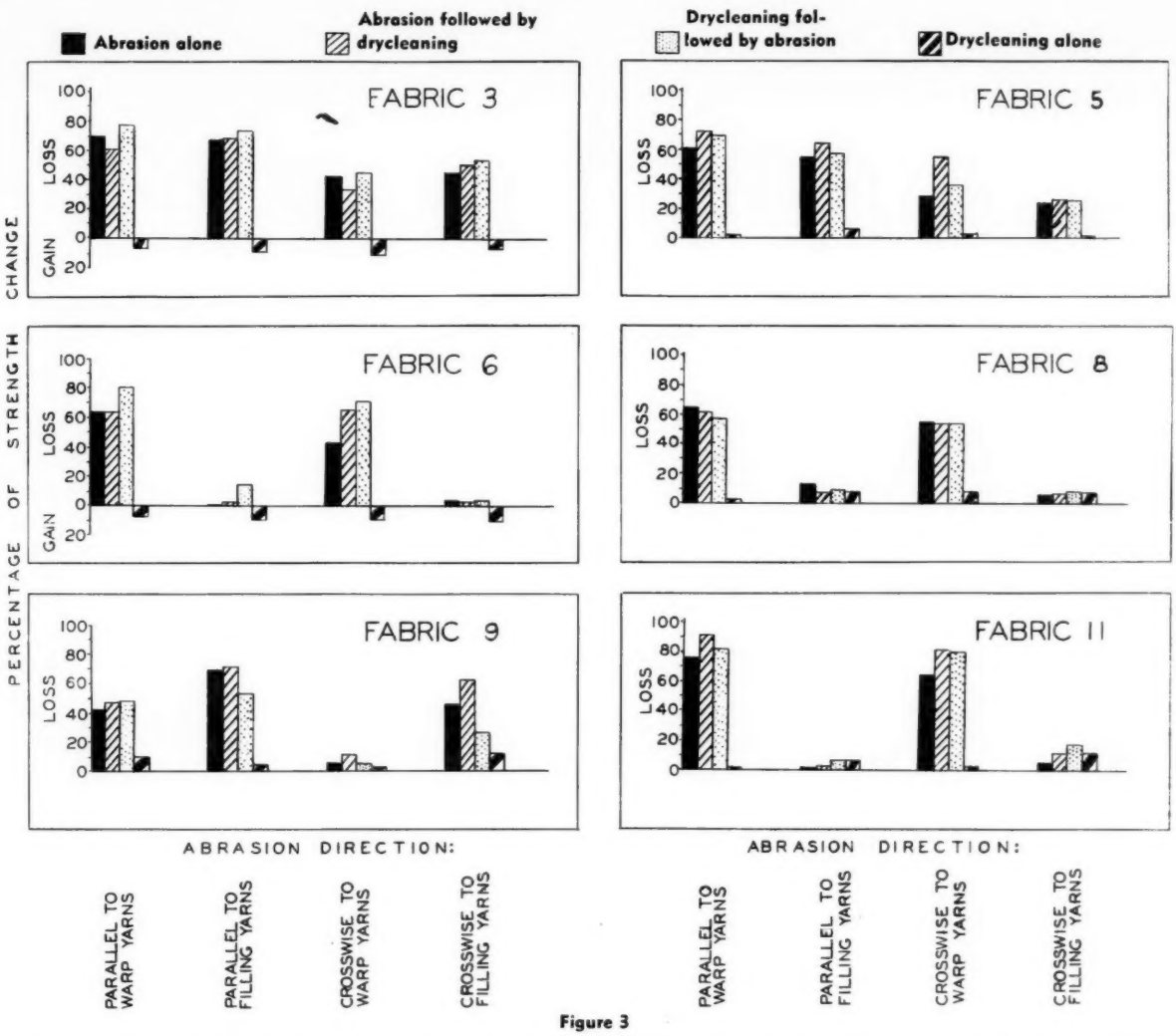


Figure 3

Change in breaking strength of specified fabrics resulting from a combination of the applications of test units of abrasion alternated with drycleaning.

generally were less than 10 percent lower than those for abrasion alone.

In 13 of 24 cases, the differences in breaking strength losses between samples which were laundered after abrasion and those which were laundered before being abraded were greater than 10 percent and for this reason are considered as significant. In the remaining 11 cases the differences were not significant according to the definition of this term.

ABRASION AND DRYCLEANING——It was found that in six of the 24 tests, only, was there a significant difference between the strength losses incurred from abrasion and then drycleaning the same sample, or from the reverse order of these operations. Three of these six exceptions showed greater losses in the first and three in the second order of operation.

The increases in strength shown by the Blue Taffeta and Blue Gabardine when subjected to drycleaning alone are explainable at least partially by shrinkage in the warp direction of the Blue Taffeta and in both directions of the Blue Gabardine.

COLOR CHANGE——It is difficult to determine color changes on abraded samples because of the small area abraded, and because of various other factors which influence the apparent color change by visual examination, such as disturbance of threads. Within these admitted limitations, the following subjective observations were made.

It was noted in the case of the Red Salyna (Fabric Number 9) that the rayon portion of the two-ply yarn was deeper in tone than the cotton portion. Since the yarn was so twisted that the rayon was more intimately exposed to the abrasive wheels, these were rubbed away first leaving the lighter cotton ply, thus giving the abraded area slightly lighter appearance. In the case of Tackletwill *B* (Fabric Number 11), which is composed of a rayon warp and a cotton filling, the rayon again was of a higher luster and a darker tone than the cotton filling yarns. Subjection to an abrasive treatment wore away filaments of the rayon, reducing the luster and allowing more of the cotton to show through; hence an apparent loss in color was shown. Loss of luster resulting from rupture of individual filaments in the warp yarn on the rayon Satin (Fabric Number 8) caused a similar loss in color. Slight roughing up of the Fuji (Fabric Number 5) was revealed in the abraded area; and in the case of the Blue Taffeta (Fabric Number 3), the fact that the dye had not penetrated the yarn thoroughly, particularly on the

printed areas, left a lighter shade remaining after abrasion of the outside colored yarn.

In every case, color changes in the abraded area were apparent, for the reasons pointed out, both on the fabrics treated with abrasion alone, as well as on those treated with abrasion combined with each of the other agents. No difference was apparent between those subjected to abrasion before the other agents and those abraded after treatment with these agents.

While color changes in abraded areas were apparent, the classifications within the visual color difference are not sufficiently fine to show these variations, since the fading from light and laundering was found to be of so much greater degree than the fading produced by abrasion.

SUMMARY

This study, preliminary in nature, was concerned with the relative changes in strength and in color from the application of abrasion alone, and of abrasion combined, respectively, with the agencies of light, laundering, and drycleaning in different orders of application.

From this preliminary study, it appears that other agents applied alternately, affect the resistance of fabrics to abrasion in various ways, depending upon the characteristics of the fabric. For this reason it would also effect a different final resistance to abrasion than is shown by the abrasion test on new fabrics alone. Since the effect on each fabric is different, only by combined tests would it be possible to predict by laboratory procedures the abrasion resistance of a fabric under actual use conditions.

ACKNOWLEDGMENTS

The authors are indebted to the Ellen H Richards Institute and to the American Viscose Corporation for the opportunity of being associated with the research studies on accelerated aging tests for rayon being conducted under their joint auspices.

BIBLIOGRAPHY

(1) Borton, H E; Butz, M; Moore, P B K; Williamson, D D; La Bossier, I; Blackmore, B; Kuschke, B; and Mack, P B, *J Home Econ* 34, 539 (1942).
(2) Kaswell, E R, *Textile Research J* 16 (1946).
(3) Keeney, P E.
(4) Lyle, D S, *Am Dyestuff Reptr* 36, 623 (1947).
(5) Lyle, D S; Mack, P B; Bonnet, F; Wachter, A R; and Rice, C W, *ibid* 37, 251 (1948).
(6) Ream, E.
(7) Zook, M H, *Am Dyestuff Reptr* 39, 679 (1950).
(8) Zook, M H, *ibid* 39, 795 (1950).

• PATENT DIGEST •

PAUL WENGRAF

PRINTING PASTES CONTAINING ONIUM DYES ———Organic Acids and Hydrophilic Assistants Added D, 1

Brit P 686,036
(Imperial Chemical Industries———Clarke, Dronfield, Thornton———Jan 14, 1953)

The preamble to this patent refers to the Company's Brit Pat 633,160 [cf *Am Dyestuff Reptr* 39, 389, (1950)] wherein the onium dyestuff group had been defined and a printing method for this class had been outlined. This method consisted principally of adding a mixture of a weak acid or acid salt and an alkaline salt of a weak acid to the printing paste, which on steaming changed from a weakly acid to a weakly alkaline state, improving the fixation of the dye on the fiber.

According to the current invention superior fixing results are attained by adding to the onium dyestuff printing pastes an organic acid and a hydrophilic agent, steaming and optionally aftertreating with a precipitating agent.

The onium dyestuffs mentioned in Brit Pat 633,160 are characterized by quaternary ammonium, ternary sulfonium or isothiouronium groups. The present patent refers specifically to the last mentioned type, containing *one or more thiouronium* groups, thus apparently excluding the onium dyes of different constitution (based on quaternary ammonium or sulfonium radicles). Accordingly the examples call for reaction products with tetramethyl thiourea.

Organic acids applied in this method include monochloroacetic, citric, lactic, glycollic or other acids that do not tender cotton but solubilize the dye.

Useful hydrophilic organic assistants include β-β'-dihydroxy diethyl sulfide (Glycein), resorcinol, ethylene glycol, glycerol, urea, etc.

Steaming for 10 minutes after printing was found to give adequate results. Generally development in cold water followed by hot soaping is sufficient, but precipitating agents, such as alkalis, thiocyanates or aromatic sulfonic acids or salts thereof, might be employed after a shorter steam treatment. Naphthalene di- or trisulfonic acid salts are especially mentioned in addition to numerous other organic or inorganic precipitants. Adding small amounts of triethanolamine salts of organic acids to the printing paste is said to improve the fastness. It is further suggested that the content on inorganic salt electrolytes in the printing paste be kept as low as possible to obtain maximum fastness.

Example: a paste containing the condensate of a copper phthalocyanine with tetramethylthiourea, lactic acid, dihydroxy diethyl sulfide, thickened with starch tragacanth is printed on a cotton fabric. The print is dried and aged at 100°C for 10 minutes, aftertreated with dichromate-acetic acid, rinsed, soaped at the boil and rinsed again.

This process can also be applied to wool and silk, and also with good effect on cellulose acetate; resorcinol is normally used in this case as the hydrophilic component. The same agent is said to give good results in printing nylon when applied in sufficient concentrations to exert a crimping effect.

Note

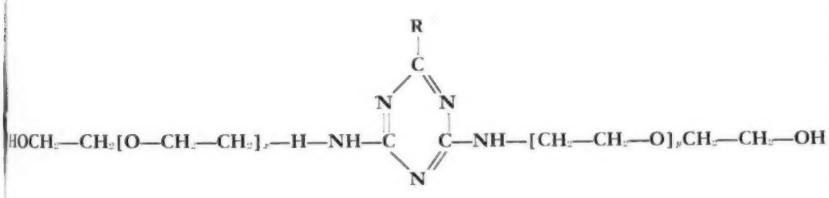
In reference to the digest of USP 2,626,202 on page 739 of the issue of October 26, 1953, an official of Atlas Color and Chemical Co Inc, South Boston, Mass, calls attention to the fact that the use of Clarapent O, an ethylene oxide condensate, is recommended in another example (not mentioned in this digest) as a dyebath assistant, and that the titanous salt to be used as a reducing agent belongs to the "Atlas Stripper" compounds, manufactured by the Company.

DYEING NITROGENOUS FIBERS WITH METALLIZED AZO DYES———Nonionic Substituted Triazines C, 4, 06

U S Patent 2,638,404
(American Cyanamid———Millson, Mooradian ———May 12, 1953)

Quite generally the dyeing of wool, nylon and other N-containing fibers with premetallized dyes of the Neolan or Palatine Fast type requires high amounts of inorganic acids, which cause in extreme cases hydrolysis of the amide linkages, decreased tensile strength and a harsh hand. Then tendency heretofor was to reduce the acid content and to use penetrating agents to improve leveling of dyeing. Cation surface-active agents have served to increase penetration and therefore levelness, but in their use scum formation presents another serious difficulty, i e, insoluble, highly colored complexes are generated from the acid groups of the dye and the cationic surfactants. Specky dyeings result from the colored scum portions adhering to the fabrics.

This problem reportedly is solved by using nonionic substituted triazines as dyeing assistants. These are described as condensates of alkylene oxides with 2-alkyl-guanamines according to the general formula:



The alkyl chain R may contain 7 or more C atoms; the sum of factors x and y may vary between 9-98 (glycidol may be substituted for ethylene oxide or other alkylene oxides), but in this case there is a limit too. The strength of the shade is *inverse* to the number of solubilizing alkylene oxide groups. Thus in any individual case a compromise must be found between solubility and depth of dyeing.

It is claimed that no scum formation occurs when the current dyeing method is employed. Assistants may be added at will in small portions to the dyebath, thus permitting the adaptation of the concentration of these compounds during the dyeing operation, without significant scum formation or precipitation. The process is said to be very useful for dyeing loose material, such as carpet yarns, and wool with low twist.

Example: prewetted wool is dyed in a dyebath containing the chromium complex of the azo dye obtained by coupling diazotized aminohydroxy napthalene-sulfonic acid with beta-naphthol in the presence of about 8% formic acid and the reaction product of stearoguanamine with 11 mols ethylene oxide. The dyeing is more level and much stronger than that of a similar sample where the dyeing assistant is omitted.

References cited by the Patent Office:

U S Pat 2,470,080 (American Cyanamid/1949): a particular type of nonionic agent (obtained by reacting a polymerized drying oil acid alkylolamide with ethylene oxide) is used in dyeing premetallized acid azo dyes, allowing the required amount of sulfuric acid to be reduced.

U S Pat 2,040,796 (General Aniline/-1936): dyeing animal fibers with chromium complex dyes (using reduced acid quantities) by adding a protective colloid, such as glue, starch, sulfite waste liquor, degraded protein products, and the like.

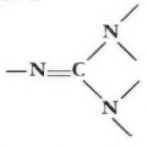
Am Dystuff Reptr of March 6, 1950, p152-154 carries an article by Luttringhaus on the subject of dyeing with metallized dyes. Particular mention is made of the use of nonionic assistants, such as Palatine Fast Salt O.

IMPROVING FASTNESS OF COPPER-TREATED DYES ———Combined with Aldehyde Condensates C, 4, 02

U S Patent 2,631,920
(Ciba Ltd———Albrecht———March 17, 1953)

This patent belongs with a series protecting methods for aftertreating copper-complex direct dyeings with aldehyde condensates. A typical patent of this group, U S Pat 2,526,106, has been reported in *Am Dyestuff Reptr 40,* 198, (1951) (see references below).

The current patent advocates the use of formaldehyde condensed with dicyano diamide, dicyano diamidine, guanidine, etc, or generally with bases containing the grouping



It differs principally from similar methods and especially from that described in U S Pat 2,526,106 in that the dyeings with copper-complex compounds or with dyeings capable of forming these compounds are aftertreated with one of the aforementioned condensates. Combined with an *aftertreatment with water-soluble copper compounds,* such as copper acetate. It is essential that the *condensation* is carried out in *acid media.*

Example: a cotton fabric dyed with a copperable direct dyestuff is aftertreated for half an hour at 20° C with a warm-water-soluble acid-condensed product of dicyanodiamide, formaldehyde and copper acetate. The dyeings prove to be fast to washing and soaping at 70° C.

This method is claimed to be superior to similar processes because it offers better stability to steam, which is especially important in producing printed discharges. Another advantage is that better fastness to washing can be attained with acid-condensed products as compared with methods using condensates produced in alkaline media.

Among the references cited by the Patent Office:

U S Pat 2,526,106 (Ciba/1950): aftertreating direct dyes with complex water-soluble copper compounds combined with formaldehyde condensates, dicyanodiamide, etc. (These are analogous to the bases mentioned in the current patent). [Cf *Am Dyestuff Reptr 40,* 198 (1951)].

U S Pat 2,440,988 (Geigy/1948): dicyano diamide-formaldehyde condensates used for the purpose described above are hygroscopic and sticky. They must be reacted with ammonium salts of a mineral acid and then with formaldehyde to prevent stickiness.

U S Pat 2,435,591 (Ciba/1948): certain vat dyeings which would ordinarily be subject to fiber tendering when exposed to sunlight may be aftertreated with a melamine-formaldehyde or dicyanodiamide condensate. [CF *Am Dyestuff Reptr 37,* 568, (1948)].

U S Pat 2,405,863 (Geigy/1946): condensates of dicyanodiamide-formaldehyde, urea and an ammonium salt will help improve other fastness properties of direct dyeings without impairing light fastness.

U S Pat 2,364,726 (Ciba/1944): combining the resin and copper-salt aftertreatments for direct dyeings to improve wet fastness and light fastness simultaneously.

Brit P 599,830 (Ciba/1948): improving copper-aftertreated direct dyeings by an aftertreatment with a formaldehyde condensate or with a compound of the urea group having a lower oxygen-to-carbon ratio than urea itself, thus, cyanamide, dicyanodiamide, melamine, etc.

WATER-REPELLENT FABRICS——Metal Soap Dispersions plus Nonionic Agents G, 2, 02

U S Patent 2,635,055
(Figdor——April 14, 1953)

Means of obtaining nondurable water-repellent finishes (based on solutions of waxes and metal soaps in solvents or dispersions of metal soaps) through the use of protective colloids have long been known. (See the digest to Du Pont's U S Pat 2,628,171 on page 891, Volume 43, of *Am Dyestuff Reptr for 1953).*

The inventor states that dispersions utilizing protective colloids, such as glue or gelatine, may have many disadvantages: the stability of the dispersion decreases upon dilution and the fabrics tend to develop a putrid odor and to be readily attacked by mildew. Other protective agents, such as polyvinyl alcohol or methylcellulose, have the effect of thickening the emulsion, while at the same time decreasing the water-repellent effect.

The objectives of the current invention therefore are to develop a freely flowing durable dispersion, easily dilutable with water, and particularly, to eliminate the use of protective colloids as mentioned above.

The compositions covered by the present patent contain:

a) a wax, e g, paraffin, bees wax, or the like;

b) an anionic agent, i e, a soap, forming insoluble water-repellent metal soaps (soaps of fatty acids with amines that are volatile with water vapors are preferred since they increase the water-repellent properties in decomposing);

c) a polyvalent metal salt, such as aluminum formate, zirconium formate, aluminum acetate or zirconium acetate;

d) a nonionic water-dispersible agent, e g, mannitan palmitate, an ethylene oxide condensate, such as polyoxyethylene ether, condensates of alkylphenols with ethylene oxide, nonionic polyethylene glycol fatty esters, or the like. (Preferred products include Tweens, Igepal or the monolaurate of Carbowax 1000 or polyethylene glycol).

Example: paraffin (m p 52-55° C) is emulsified in water by using the stearic acid soap of triethanolamine. The emulsion is cooled down to room temperature and aluminum acetate is added; the precipitate disperses upon agitation to form a heavy paste which cannot be diluted further with water without breaking the emulsion. Upon the addition of one p monolauric ester of polyethylene glycol (mol weight 600) to 100 p of this emulsion the paste changes while being stirred to a thin liquid which is stable and which can easily be diluted with water without breaking.

Another example describes how a mildew-resistant, water-repellent finish may be obtained by adding copper acetate in dilute acetic acid to the aforementioned composition.

Fabrics impregnated with a dispersion of this type and dried at 100° C are said to exhibit good water repellency. This effect may be improved by a short heat aftertreatment at 150° C.

Among the references cited by the Patent Office:

U S Pat 2,456,595 (S C Johnson & Son/1948): a solid water-repellent composition readily dispersible in water consisting of paraffin, a polyvalent metal salt (aluminum acetate) and a mixed nonionic dispersing agent comprising monopalmitate of sorbitan or polyoxyalkylene sorbitan. Soaps of any kind are omitted.

U S Pat 2,447,475 (Monsanto/1948): a self-dispersing agent for preparing stable oil-in-water emulsion for various purposes, but primarily for dispersing toxicants. It consists of an aromatic solvent (xylene), a wetting agent (alkylaromatic sulfonate) and a nonionic condensate of the Igepal type.

U S Pat 2,328,431 (Gen Aniline/1943): making fabrics water-repellent by impregnating with an emulsion of paraffin-soap-zirconium salts, drying, and removing the remaining hydrophilic components by an alkaline treatment.

U S Pat 2,133,480 (I G Farben/1938): preparing textile assistants in general by etherifying the condensates of high alcohol (oleyl alcohol) and ethylene oxide with an unsaturated radicle from C_{12} to C_{18}.

DYEING POLYVINYL FIBERS WITH DISPERSED DYES——Swelling plus Swelling—Compensating Agents C, 4, 07

U S Patent 2,635,942
(Sandoz A G——Thummel——April 21, 1953)

The chief drawback in dyeing fibers composed of polyvinyl- and/or polyvinylidene derivatives is their shrinkage at elevated temperatures. The object of the present invention is to prevent shrinkage at dyeing temperatures between 60-100° C.

This problem reportedly has been solved by coloring with dispersed dyes, emulsified by various appropriate agents, in the presence of two groups of assistants which act in opposite ways. One acts as a swelling agent, the other as a swelling-compensating compound, thus permitting good control of the dyeing and shrinking process.

Typical swelling agents include, among others, hydrogenated napthalene derivatives, alkyl benzenes (toluene or xylene), methylene dichloride, higher alcohols (butanol) or esters (amyl acetate), and so forth.

Swelling-compensating agents are exemplified by hydrogenated benzene derivatives (cyclohexanol), low alcohols (methanol, ethanol), aldehydes, alkanolamines and glycols or other polyalcohols.

Colorants that may be applied in the present process include acetate dyes, pigment dyes, insoluble azo dyes and non-solubilized vat dyes. They may be dispersed in the dyebath by using known emulsifying agents, such as glycolethers of higher alcohols, sulforicinoleates, alkyl aryl sulfonates, or even soaps.

Example: a dyebath containing Cellitazol B (C I #499) is dispersed with the polyglycolether of tridecanol to which tetrahydronapthalene is added as a swelling agent and methyl cyclohexanol as a swelling-compensating agent. Polyvinyl filaments are dyed in this bath for ¾ hours at 90° C without undue shrinkage. Thereafter the black shade is developed by diazotization and coupled with beta-hydroxy-napthoic acid as usual.

Another example cites a dyeing process with an emulsion of Rapid Fast Red RH (Pr # 336). Vat dyes in pigment form, such as Carbanthrene Brilliant Green (C I # 1101), are applied in the dispersed state, reduced and reoxidized.

Among the references cited by the Patent Office:

U S Pat 2,394,689 (American Viscose Corp/1946): dyeing polyvinyl fibers from an aqueous dyebath containing a water-insoluble aromatic ketone, an aliphatic-aromatic ketone or similar products. [Cf *Am Dyestuff Reptr* 35, 336 (1946)].

U S Pat 2,260,543 (Carbide & Carbon/-1941): dyeing thermoplastic materials from a solution of the dye in a resin-solvent-nonsolvent mixture (e g, acetone-toluene), and optionally rinsing with water.

Brit P 568,037 (American Cyanamid/-1945) protects a special group of azo dyes recommended by the manufacturer for dyeing vinyl polymer fibers. The group is characterized by linking to an N atom of the dye alkyl, alkoxyalkyl or polyalkoxyl radicles, these ether groupings probably having some affinity for the vinyl polymers.

Proceedings of the
American Association of Textile Chemists and Colorists

Copyright, 1954, American Association of Textile Chemists and Colorists

Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

FEBRUARY 1, 1954

National Officers of the Association

President.....J ROBERT BONNAR, General Dyestuff Corporation, 435 Hudson St, New York 14, N Y

Vice President (Central Atlantic Region).....GEORGE L BAXTER, Bradford Dyeing Association, 40 Worth St, New York 13, N Y

Vice President (Southern Region).....SAMUEL L HAYES, Ciba Co, Inc, P O Box 1988, Charlotte 1, N C

Vice President (Western Region).....JOSEPH H JONES, Phoenix Dye Works, 1963 Southport Ave, Chicago 14, Ill

Vice President (New England Region)....GEORGE O LINBERG, Synthron, Inc, Ashton, R I

Secretary..HAROLD C CHAPIN, Lowell Technological Institute, Lowell, Mass

Treasurer.....ALBERT E SAMPSON, National Aniline Division Allied Chemical & Dye Corp, 150 Causeway St, Boston 14, Mass

Founder.....LOUIS A OLNEY (Deceased)

Chairman of the Executive Committee on Research....LEONARD S LITTLE, 101 West 31st Street, Room 1500, New York 1, N Y

Director of Research....HAROLD W STIEGLER, Lowell Technological Institute, Lowell, Mass

Standing Committees of the Council

Technical Committee on Research.....CHARLES W DORN, *Chairman*
Publicity.....GEORGE H SCHULER, *Chairman*
Conventions.....KENNETH H BARNARD, *Chairman*
Appropriations.....ALBERT E SAMPSON, *Chairman*
Constitution and Bylaws.....HAROLD C CHAPIN, *Chairman*
Membership and Local Sections.....SAMUEL L HAYES, *Chairman*
Corporate Membership.....ALBERT E JOHNSON, *Chairman*
Publications.....PERCIVAL THEEL, *Chairman*
Technical Programs.....WALTER M SCOTT, *Chairman*
Technical Supplies.....HAROLD C CHAPIN, *Chairman*

Councilors

Representing Sections

NEW ENGLAND REGION

Northern New England: ELMER E FICKETT, JOHN P PLOUBIDES, ROBERT D ROBINSON, SAWYER F SYLVESTER
Rhode Island: ERNEST J CHORNYEI, RAYMOND W JACOBY, THORWALD LARSON, EDWARD W LAWRENCE
Western New England: RAYMOND J CAREY

CENTRAL ATLANTIC REGION

Hudson Mohawk: ALBERT E HERRMANN, JR, JOHN J HANLON
New York: ROBERT C ALLISON, MATTHEW J BABEY, CHARLES W DORN, WELDON G HELMUS, PATRICK J KENNEDY, PAUL J LUCK, JAMES J MARSHALL
Philadelphia: CARLETON T ANDERSON, EDWARD C DIEHL, HARRY L MORGAN, ANGE E RAIMO, ERNEST E RETTBERG, JR, JACKSON A WOODRUFF

SOUTHERN REGION

Piedmont: HARLEY Y JENNINGS, JOSEPH LINDSAY, JR, M M McCANN, RAPHAEL E RUPP, R HOBART SOUTHER
South Central: JOSEPH D MOSHEIM
Southeastern: S JACK DAVIS, H GILLESPIE SMITH
Washington: WALTER M SCOTT

WESTERN REGION

Mid-West: ARTHUR T BRAINERD, SAMUEL KLEIN, ELLIOTT MORRILL
Pacific Northwest: GEORGE S BARKER
Pacific Southwest: ANGUS ROBERTS

Past Presidents

ELVIN H KILLHEFFER, P J WOOD, WILLIAM H CADY, ALBAN EAVENSON, CARL Z DRAVES, THOMAS R SMITH, WILLIAM D APPEL, HENRY F HERRMANN, C NORRIS RABOLD

Local Section Officers

New England Region

NORTHERN NEW ENGLAND

Chairman.....ERNEST R KASWELL, Fabric Research Laboratories, Inc, 665 Boylston St, Boston 16, Mass
Secretary.....AZEL W MACK, Dexter Chemical Corp, 581 Boylston St, Boston 16, Mass
Vice-Chairman—JOHN M GOULD *Treasurer*—WILLIAM W PENNOCK

RHODE ISLAND

Chairman.....ARTHUR F McLEAN, Glenlyon Print Works, Phillipsdale, R I
Secretary.....CHARLES F STOKES, Carbic Color & Chemical Co, 87 Weybosset St, Providence, R I
Vice Chairman—REMUS F CARROSELLI
Treasurer—J WILLIAM TIMPERLEY

WESTERN NEW ENGLAND

Chairman.....ARTHUR S NYQUIST, American Cyanamid Co, 1937 W Main St, Stamford, Conn
Secretary.....NATHANIEL J GLADE, American Cyanamid Co, 1937 W Main St, Stamford, Conn
Vice Chairman—SOCRATES V VANIOTIS
Treasurer—THOMAS G GILLICK

Central Atlantic Region

HUDSON-MOHAWK

Chairman.....IRWIN J SMITH, Surpass Chemical Co, 1254 Broadway, Albany 1, N Y
Secretary.....WILLIAM A NELSON, Ritter Chemical Company, Inc, 403 W Main St., Amsterdam, N Y
Vice-Chairman—HARVEY GENDREAU *Treasurer*—JOHN W MERRILL

NEW YORK

Chairman.....WELDON G HELMUS, Fair Lawn Finishing Co, Fair Lawn, N J
Secretary.....NORMAN A JOHNSON, American Dyestuff Reporter, 44 East 23rd St, New York 10, N Y
Vice-Chairman—JOHN H HENNESSEY *Treasurer*—GEORGE A JONIC

PHILADELPHIA

Chairman.....FREDERICK V TRAUT, Globe Dye Works Co, 4500 Worth St, Philadelphia 24, Pa
Secretary.....THOMAS J SCANLON, Dexter Chemical Corp, P O Box 657, Springfield, Delaware County, Pa
Vice Chairman—THOMAS H HART *Treasurer*—PERCIVAL THEEL

Southern Region

PIEDMONT

Chairman.....HENRY A RUTHERFORD, School of Textiles, N C State College, Raleigh, N C
Secretary.....CLARENCE HOOPER, Burlington Mills Corp, Burlington, N C
Vice-Chairman....H J JORDAN, JR *Treasurer*....C O STEVENSON

SOUTH CENTRAL

Chairman.....PAUL O ANDERSON, Peerless Woolen Mills, Rossville, Ga
Secretary.....WILLIAM F LUTHER, Dixie Mercerizing Co, Chattanooga 1, Tenn
Vice Chairman—JOE T BOHANNON, JR *Treasurer*—J C WHITT

SOUTHEASTERN

Chairman.....T HOWARD McCAMY, Pepperell Mfg Co, Lindale, Ga
Secretary.....JOHN C COOK, W R C Smith Publishing Co, 806 Peachtree St, N E, Atlanta, Ga
Vice-Chairman.....W B GRIFFIN *Treasurer*.....J W SWINEY

WASHINGTON

Chairman.....MILTON HARRIS, Harris Research Laboratories, 1246 Taylor Ave, N W, Washington 11, D C
Secretary.....GEORGE S BUCK, JR, National Cotton Council of America, 1832 M St, N W, Washington 6, D C
Vice-Chairman—HENRY D BARKER *Treasurer*—HERBERT A EHRMAN

Western Region

MID-WEST

Chairman.....J GORDON STOTT, Ciba Co, Inc, 325 West Huron St, Chicago 10, Ill
Secretary.....HARRY W ERICSON, American Aniline Products, Inc, 820 South Clinton St, Chicago 7, Ill
Vice Chairman—ARTHUR I HULTBERG *Treasurer*—JACK G KELLEY

PACIFIC NORTHWEST

Chairman....(Vacant)
Secretary....THEODORE M MARSHALL, Nyanza Color and Chemical Co, Inc, 115 SW Fourth Ave, Portland 4, Ore
Vice-Chairman—DON ADAMS *Treasurer*—JOHN L AYRES

PACIFIC SOUTHWEST

Chairman.....SIDNEY SPRINGER, 311 South San Pedro St, Los Angeles 13, Calif
Secretary.....CLARICE H LINDSEY, Univ of California, Dept of Home Economics, Los Angeles 24, Calif
Vice-Chairman—ROBERT C ROTH *Treasurer*—SERGIO M DADONE

Student Chapters

BRADFORD DURFEE TECHNICAL INSTITUTE, CLEMSON COLLEGE, FAIRLEIGH DICKINSON COLLEGE, GEORGIA INSTITUTE OF TECHNOLOGY, LOWELL TECHNOLOGICAL INSTITUTE, NEW BEDFORD INSTITUTE OF TEXTILES AND TECHNOLOGY, NORTH CAROLINA STATE COLLEGE, PHILADELPHIA TEXTILE INSTITUTE, RHODE ISLAND SCHOOL OF DESIGN, UTICA TECHNICAL INSTITUTE

*AATCC Research Newsletter No. 9

NEWS IN GENERAL

The next regular quarterly meetings of AATCC research groups will be at the Hotel Dennis, Atlantic City, N J, during the week of the 1954 American Textile Machinery Exhibition, April 26-30. Notices will be mailed well in advance so that those who wish to take in both events can make their plans accordingly.

Messrs Dorn and Little have been in close touch with representatives of the Plastic Coated Fabrics Association in connection with their study of the test procedures required under the Flammable Fabrics Act. At the same time the Industry Advisory Committee under Commercial Standard CS 191-53 (Flammability of Clothing Textiles) has had several meetings to deal with the many complex problems of interpretation and application.

Eugene W K Schwarz, textile consultant, has undertaken a survey of sectional research advisory committees to evaluate their functions, needs and capabilities in relation to the overall research program of AATCC. The survey will take some time to complete but is being counted upon to yield highly important data that will lead to better co-ordination of local and national research objectives.

On behalf of AATCC Research, ECR Chairman L S Little attended the January 15th meeting of the American Standards Association, at which the establishment of ASA performance standards for all fiber classification was approved. Mr Little promised co-operation in furnishing required test procedures. Meanwhile, H W Stiegler attended all sessions of a three-day work program of ASA Sectional Committee L-24 on performance standards for Hotel, Restaurant and Institutional Fabrics. These meetings concluded January 14.

American Viscose Corporation has announced that it will continue its support of the special research project on dimensional change being handled at AATCC Research Headquarters.

AT RESEARCH HEADQUARTERS

Another practical use of the Accelerotor is foreseen in connection with the evaluation of durable-type water repellents. In preliminary work, the effect of Accelerotor wear and wash procedures on a number of treated fabrics was measured by conventional water-resistance tests, including the hydrostatic-pressure and immersion-absorption tests. The Accelerotor has been suggested also as an alternate test instrument for the dynamic absorption test, an application that will be investigated shortly.

Use of the Launder-Ometer in drycleaning and washing procedures specified in the AATCC Flammability Test for Clothing Textiles #33-52 (Commercial Standard CS191-53) is being investigated. The Launder-Ometer is believed to be more readily available to laboratories than is the specified tumbler. Use of the metal tubes in the Launder-Ometer is expected to decrease materially the amount and cost of solvent now required and at the same time give better reproducibility of test results.

Recent investigations have been made to determine flammability characteristics of fabrics woven or knit from fibers other than cellulosic cotton and rayon. Studies are being made of 100% wool or worsted and various synthetics, to determine their burning properties.

COMMITTEE ACTIVITIES

Max Winkler, Chairman of AATCC's Committee on Abrasion, has announced that a joint meeting will be held on February 17 with ASTM's abrasion group.

John Warner, formerly chairman of the Committee on Shrinkage, has been named to head the new subcommittee on shrinkage in domestic and commercial tumble dryers.

The Convention Committee met recently with ECR to lay plans for an exhibit of AATCC's research program at the 1954 annual convention in Atlanta, Ga.

* Published every other issue of the AMERICAN DYESTUFF REPORTER.

SECRETARY'S FINANCIAL REPORT—OCTOBER 30, 1953

Received and transmitted to Treasurer	*Applications*	*Dues, regular & reinstate*	*Dues, Corporate & Sustaining*	*Miscellaneous*	*Totals*
August 1 to Sept 1, 1953	$ 313.50	$ 101.50		$ 8,742.06	$ 9,157.06
Sept 1 to Oct 30, 1953	1,029.50	21,732.50	680.00	4,767.40*	28,209.40
Total in fiscal year to October 30	1,343.00	21,834.00	680.00	13,509.46	37,366.46
	Leaving deposited with Secretary				3,124.24
For comparison, receipts to Oct 30, 1952	1,042.50	21,778.00	2,987.50	2,988.43	28,796.43

* Miscellaneous items

Dividends and interest	772.55
Reporters & reprints	23.35
Dry cleaning kit	2.00
Year Books	576.27
Crockmeters	339.44
Crock cloth	104.03
Multifiber cloth	324.33
Moth cloth	46.25
Water test apparatus	30.30
Dyed standards	74.00
Knitted tubing	12.00
Gas-fading units	23.00
Buttons	5.00
Color transfer charts	47.50
Colour Index prepayments	1422.00
Analytical Methods	249.00
Application of Vat Dyes	590.50
Cotton skeins	57.88
Standard grease wool	18.00
Accelerotor	50.00
	4767.40

H C CHAPIN,
Secretary

Membership Applications

January 15, 1954

SENIORS

John Alexander—Mgr, Rayon & Cotton Div, Leeds Dyeing & Chem Wks, Melbourne, Australia. Sponsors: F Tschenlein, S W Helmus.

Joseph G Baric—Tech salesman, E I duPont de Nemours Co, Inc, Chicago, Ill. Sponsors: F H Ahl, Jr, J M Remsen.

Lloyd W Carpenter — chemist, E W Twitchell, Inc, Philadelphia, Pa. Sponsors: M H Boyce, R E Nickerson.

James A Cooney—Textile chemist, Cranston Print Work, Cranston, R I. Sponsors: R H Phillips, E W Lawrence.

Jacques Corbiere — Research Dept mgr, Societé Rhodiaceta, Lyon, France.

Fred W Cox, Jr—Chief chemist, Deering, Milliken Research Trust, Pendleton, S C. Sponsors: F M Sell, J E Livak.

Hal-Curtis Felsher—Vice-pres in charge of research & development, Claremont Pigment Dispersion Corp, Brooklyn, N Y. Sponsors: W R Hornquist, J R Bonnar.

Scott H Foster—Group leader of textile chem res, Monsanto Chem Co, Everett, Mass. Sponsors: J W Stewart, M H Roth.

Lew I Frosgong—Owner, Diamond Chemical Co, San Francisco, Calif. Sponsors: J R Nehmens, D O Paulsen.

John K Heywood — Finishing foreman, Snow White Bleaching & Dyeing Co, Royersford, Pa. Sponsors: F V Traut, M A Noonan.

Joseph G Jacobs—Dyer, United Dye & Finishing Co, Catasaqua, Pa. Sponsors: M H Boyce, R R Shimp.

John R Janket—Dyer, Putnam Finishing Co, Mechanicsville, Conn. Sponsors: S B Sladen, E J Allard.

Kenneth W Johnson—Chemical salesman, Sandoz Chemical Works, Hudson, Mass. Sponsors: F H Casey, J E Ormiston, Jr.

Philip D Pence—Quality control, E T Barwick Mill, LaFayette, Ga. Sponsors: G C Jones, Jr, P J Smith.

John P Racine—Research textile chemist, Rumford Chemical Wks, Rumford, R I. Sponsors: J J Dillon, W Milne.

James H Wakelin—Director of research, Textile Research Inst, Princeton, N J. Sponsors: G O Linberg, J J Dillon.

JUNIORS

James J Kelley, Jr—Dyeing technician, R W Bates Piece Dye Works, Garnerville, N Y. Sponsors: J Niewaroski, S H Newaroski.

Charles R Williams — Research chemist, Monsanto Chemical Company, Boston, Mass. Sponsors: J W Stewart, R L Nickerson.

ASSOCIATES

Josen F Beck—Textile colorist, Nyanza Color & Chemical Co, Inc, New York, N Y.

Billy M Davis—Salesman, International Salt Company, Inc, Scranton, Pa.

Stanley B Mulder—Sales rep, Barrett Div, Allied Chemical & Dye Co, New York, N Y.

STUDENTS

Bobby R Clement — Clemson College. Sponsor: J Lindsay, Jr.

Howard Cook—Clemson College. Sponsor: J Lindsay, Jr.

Peter Turner—Clemson College. Sponsor: J Lindsay, Jr.

Marcella S Czekanski—Lowell Tech Inst. Sponsor: E E Fickett.

Frances T Libbey — Lowell Tech Inst. Sponsor: E E Fickett.

Emil A Tetzner — Philadelphia Textile Inst. Sponsor: W H Hughes.

CORPORATE

Lowell Technological Institute Research Foundation

APPLICATIONS FOR TRANSFER TO SENIOR MEMBERSHIP

Robert E Crowell
Kenneth G McKenzie
Alan M McNally
Lawrence L Shailer, Jr.
Jose F Valente

CALENDAR

COUNCIL
1954—Apr 30 (Atlantic City), June 15, Sept 15, Nov 19.
1955—Jan 21, Apr 15, June 17

NATIONAL CONVENTIONS
Sept 15-18, 1954 (Atlanta Biltmore, Atlanta, Ga); Sept 21-23, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J).

HUDSON-MOHAWK SECTION
March 5; April 9, May 14 (Albany); June 18 (Outing).

MID-WEST SECTION
February 13 (Hotel Bismarck, Chicago, Ill).

NEW YORK SECTION
Feb 26 (Hotel Statler, N Y); April 23, May 21 (Swiss Chalet); June 18 (Outing, North Jersey Country Club, Wayne, N J).

NORTHERN NEW ENGLAND SECTION
Feb 12 (MIT Faculty Club, Cambridge, Mass); Apr 9 (Lowell Tech, Lowell, Mass); June 11 (Outing—Merrimack Valley C C, Methuen, Mass); Oct 8 (Colonial C C, Lynnfield, Mass); Dec 10 (Woodland Golf Club, Auburndale, Mass).

PIEDMONT SECTION
Apr 10 (Hotel Roanoke, Roanoke, Va); June 11-12 (Outing, Mayview Manor, Blowing Rock, N C); Sept 11 (Hotel Barringer, Charlotte, N C).

PHILADELPHIA SECTION
Feb 26, Apr 9 (Kugler's Restaurant, Philadelphia, Pa); May 21 (Outing—Manufacturers Golf & Country Club, Oreland, Pa); Sept 24, Oct 29 (Penn-Sherwood Hotel, Philadelphia, Pa); Dec 3 (Kugler's).

RHODE ISLAND SECTION
Feb 25 (Johnson's Hummocks Grill, Providence); Mar 25 (Prov Eng Soc); Apr 29 (Wannamoisett Country Club, Rumford, R I); June 11 (Outing—Wannamoisett C C); Oct 14 (Johnson's); Dec 2 (Annual Meeting—Sheraton Biltmore, Providence, R I).

SOUTHEASTERN SECTION
Mar 27 (Ralston Hotel, Columbus, Ga); May 14-15 (Outing—Radium Springs, Ga); Dec 11 (Atlanta-Biltmore, Atlanta, Ga).

WASHINGTON SECTION
Mar 5 (Textile Museum, Washington, D C).

WESTERN NEW ENGLAND SECTION
Mar 19 (Rapp's Restaurant, Shelton, Conn); May 14 (Ladies Night—Waverly Inn, Cheshire, Conn); June 18; Oct 1, Nov 12, Dec 10 (Rapp's).

(A Calender of Events other than those of AATCC appears on page 83)

1953 Annual Convention
Textile Auxiliaries Group——

POLYVINYL PYRROLIDONE
A Versatile Compound with Potential Textile Uses

E C HANSEN C A BERGMAN and D B WITWER
General Dyestuff Corporation
Antara Chemicals Division
General Aniline & Film Corporation

INTRODUCTION

POLYVINYLPYRROLIDONE (PVP) is an extremely interesting and versatile organic chemical, which you will be hearing more and more about in the future. Its history goes back as far as the 1930's, but within the past three years the commercialization of PVP has proceeded very rapidly. The principal purpose of this paper is to consider the applicability of PVP in the textile field. However, a brief discussion of its use in other fields should be of general interest and might suggest new additional textile uses.

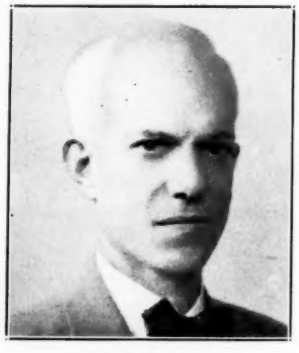
The dangers and difficulties of handling acetylene are well known to all chemists, although acetylene derivatives have been manufactured for the last 30 to 40 years. These derivatives, however, were produced at moderate temperatures and low pressures, and it was thought that these conditions were necessary for the safe handling of acetylene.

The techniques developed by J Walter Reppe of I G Farben in the 1930's enabling acetylene to be used under conditions of high temperature and pressure opened up entire new fields in organic chemistry and made feasible the manufacture of many products previously not available. General Aniline & Film Corporation has pioneered the development of new chemicals based upon the reactions of acetylene at high temperatures and pressures in this country and has considerably improved upon Reppe's original techniques.

One of the most interesting substances to have come out of this program is PVP. GAF is the sole domestic producer of this material, and its synthesis is as follows:

Acetylene is reacted with formaldehyde to produce 2-butyne-1,4-diol, which is then reduced to 1,4-butanediol. This glycol is then dehydrogenated to yield butyrolactone, which in turn is reacted with ammonia to give the corresponding lactam, 2-pyrrolidone. Reaction with acetylene produces N-vinyl-2-pyrrolidone, which can be polymerized by several different methods to polyvinylpyrrolidone. (See Figure 1).

* Presented by Emil Hansen at the Conrad Hilton Hotel, Chicago, Ill, on Sept 18, 1953.



E C Hansen

PVP is one of the acetylene compounds GAF is manufacturing by Reppe high-pressure-and-temperature technique. It has been found useful as a blood-volume expander and as a protective colloid-suspending agent for many drugs. It has the ability to solubilize and detoxify a wide variety of substances.

PVP is being extensively used for hair lacquers, in wave-set lotions, in hair-fixative preparations and is also of interest in the formulation of skin creams and pressure-dispensed shaving creams.

It has a strong combining action on certain dyestuffs and is an outstanding auxiliary for the stripping of colors, particularly vat and sulfur dyes.

PVP has possibilities as a soil-redeposition preventive; as a cross link for dyes in hydrophobic fibers and as a mordant for vat or sulfur dyestuffs.

PROPERTIES ——— PVP is a white amorphous powder with many unusual and unique properties. It can be made in several different molecular-weight ranges depending upon the desired use. PVP is compatible with many substances including other polymers, and it is soluble in water as well as in a wide variety of organic solvents. This wide solubility greatly increases the applicability of this compound in a variety of fields. Much has been written of the ability of PVP to "combine" with many substances with the result of detoxifying and solubilizing them. This most unusual property has led to several practical applications, for example, dye stripping, and this shall be considered in greater detail later. PVP can also prolong the activity of many drugs and has marked adhesive and film-forming properties. PVP, particularly high-molecular-weight forms, is also of marked interest as a thickening agent. These qualities, plus its physiological compatibility, have led to the rapid commerical use of PVP in the pharamaceutical, cosmetic, textile and other fields.

NONTEXTILE USES

PHARMACEUTICALS———PVP was initially developed in Germany and, along with many other water-soluble polymers,

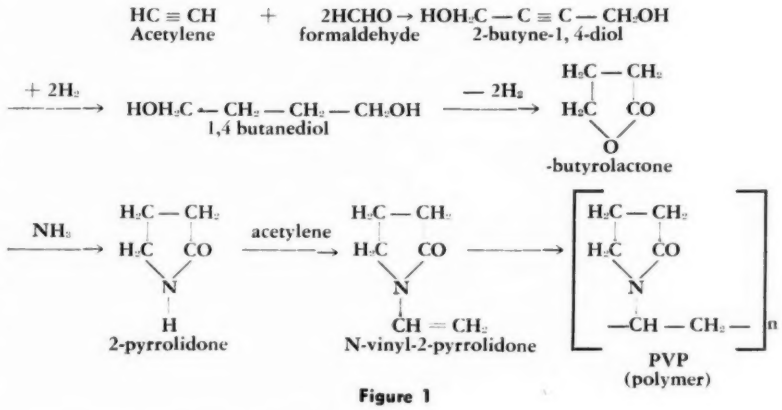


Figure 1

was thoroughly evaluated as a replacement for human plasma in the treatment of shock. The need for a satisfactory replacement in times of war or widespread civilian disasters when blood and plasma are in critical supply is readily apparent.

Volumes have been written about the complexities of shock and shock therapy and a detailed discussion of the problems is beyond the scope of this paper. However, in order to understand better the function of PVP in this application, we can briefly consider the high spots.

The critical condition which is common in all shock cases is the decrease in blood pressure and circulating blood volume. Immediate restoration is essential if life is to be sustained. It was readily apparent that an acceptable plasma substitute (preferably, blood-volume expander) should be very hydrophilic and have a molecular weight that yields solutions of a colloidal osmotic (oncotic) pressure and viscosity equivalent to that of blood serum. It should also be completely compatible with human tissues, nonallergic, and nonantigenic and, it should not interfere with blood grouping. Furthermore, it should either be eventually eliminated or be essentially indifferent to body tissues and functions. Other important criteria are the following: availability in large quantities, low cost, reproducibility, and stability to storage in tropical and arctic conditions. After extensive laboratory and clinical research it was concluded that PVP fulfills these essential requirements.

As early as 1943, PVP was widely used in Germany and France and today blood-volume expanders based upon PVP are also in use in England, Italy, Switzerland and in many Latin-American countries. The first recorded use of PVP was in Germany, where it was used extensively by army physicians and in civilian hospitals in the treatment of shock and in operative and postoperative therapy of a wide variety of conditions. The records are not complete, but it is safe to say that many hundreds of thousands of PVP infusions have been given, and there have been no reported ill effects as a result.

In this country an exhaustive evaluation of PVP since 1950 has essentially confirmed the European work. The Food and Drug Administration and National Research Council have approved it for emergency stock-piling purposes. As a result, the Federal Civil Defense Administration and the Armed Forces have purchased nearly 1,700,000 units (a unit is 500 ml of 3.5% solution), far more than any other blood-volume expander. Studies are still being conducted so that PVP can be approved for unrestricted use in civilian hospitals. It is now apparent that there is an urgent need for blood-volume expanders beyond that of emergency treatment of shock in widespread civilian or military disasters. Both human blood and plasma frequently are contaminated with the dreaded virus hepatitis, a form of jaundice. PVP, which can be produced under the most ideal conditions of purity and which is easily sterilized, does not suffer from this serious drawback. Many prominent medical authorities predict that blood-volume expanders, particularly PVP, will be in everyday use in the near future.

Plasdone, GAF's trade name for its pharmaceutical grade of PVP, is now being used as a suspending agent and retardant in several antibiotic preparations, particularly procaine penicillin. Here its efficiency as a protective colloid to prevent caking is especially important. Both the retardant and detoxifying properties are effectively employed in a procaine dental anesthetic. The duration of the procaine has been prolonged, and the toxicity and side effects have been substantially reduced. PVP is also being used as a tablet binder for a number of medicaments including antibiotics. After considerable investigation, PVP preparations for blood-typing serums have entered the market replacing bovine albumin. PVP appears to be particularly applicable as a vehicle for radiopaque substances, which are used in x-ray diagnostics and which are now available commercially.

An outstanding example of the ability of PVP to solubilize and detoxify without impairing efficacy is the combination of PVP and iodine. The nonselective germicidal action of iodine has long been known, but its irritating and sensitizing qualities have limited its use. In combination with PVP the toxic aspects of iodine are virtually eliminated, and its germicidal efficiency is unimpaired. Such products are under active investigation at this time and should appear on the market in the near future.

PVP resembles plasma proteins both chemically and physiologically and has been shown to combine with many toxins (e g, diptheria, tetanus and botulinus) and render them harmless often by effecting their elimination via the kidney. Low-molecular-weight forms of PVP are being studied in such applications.

Plasdone is currently being evaluated with numerous other drugs, such as para-aminosalicylic acid, and new preparations containing PVP are expected to appear on the market from time to time.

COSMETICS———In the cosmetic field PVP has been very rapidly introduced in several applications. Most noteworthy is its use in aerosol hair lacquers. The film-forming property of this compound and its solubility in ethanol makes this use possible; its water solubility, flexibility and hygroscopicity make it unusually effective. It is rapidly replacing shellac in such products, for PVP can be completely removed by washing, and the hair can be reset for several days merely wth a wet comb or brush. In addition, it has been reported that this polymer swells the hair slightly, and this swelling provides better hair control. The general applicability of PVP as a hair-fixative medium has led to the consideration of PVP in wave-set lotions, cream rinses, etc.

PVP is also being used in aerosol shaving lathers, where it acts as a foam stabilizer and bodying agent, permits the beard to be wetted, and gives smoother shaves. It is also being used in shampoos to provide better hair control, and this appears to be a growing application.

It is also being evaluated in aftershave lotions. A very thin layer of PVP can make the face feel smoother. Its use in skin-cleansing creams is undergoing extensive tests, and here the ability of this compound to "combine" with toxins and act as a suspending agent to prevent soil redeposition is of particular importance. In connection with this last property, PVP has been reported to be excellent for this purpose when added to detergents. This use should become economically feasible as the volume produced in this country expands.

PVP is also being investigated as a beverage clarifier and as a suspending agent in whipped cream and frozen dairy products. These uses appear very promising at the present time.

TEXTILE APPLICATION

It can be realized from the afore-mentioned properties that the complexing and solubilizing power of PVP accounts for its widespread interest and utility. These properties also make it a valuable textile chemical and textile assistant, as we shall describe here.

PVP is a highly effective stripping assistant for decolorizing or drastically weakening the color of cellulosic fibers that have been dyed with vat, sulfur and direct dyestuffs. It is presently being marketed to the textile industry under several trade names, such as Peregal ST and Albigen A, in the form of an easy-to-handle straw-colored liquid with an active-ingredient content of 30%. It is weakly cation-active and is stable to hard water and to acid and alkali in the concentrations normally encountered in the textile trade.

Prior to the discovery of the effectiveness of PVP as a stripping aid, the most satisfactory chemicals for stripping fast-color dyeings were alkylpolyglycol ether compounds in combination with reducing agents, such as sodium hydrosulfite and

sodium or zinc formaldehydesulfoxylate products. The reducing agent effects a solubilization or a partial or complete breakdown of the dyestuff molecule, depending upon the type of dye. The alkylpolyglycol-ether compounds, such as Peregal O, form complexes with the soluble color in the reducing liquor and block absorption of the dyestuff into the fiber. The Peregal O type of stripping auxiliaries form loose bonds with the dye which can be reversed, thereby permitting the color to be readsorbed by the fiber. This reversal or the breaking of the Peregal-dye bonds can be accomplished in vat dyeing by the addition of an anionic surfactant, such as an alkylnaphthalenesulfonate, to the dye or stripping bath. M Braeuer *(1)* reported, according to B Wurzschmitt *(2)* studies, that aqueous solutions of nonionic surfactants obtained by oxyethylation have *cation-capillary properties,* particularly in the presence of acids, bases or salts. He theorizes from this that a cation-active polyoxonium derivative of Peregal O is formed, which associates with the dye molecule to slow the rate of dyeing. This condition would also explain the mechanism of how an alkylnaphthalenesulfonate exhausts a vat dye in the presence of Peregal O by neutralizing the so-called "cation effect" of Peregal O.

Alkylpolyglycol ethers are in wide use today for retarding the rate of exhaustion of direct and vat dyestuffs, for leveling uneven vat dyeing by the use of a hot blank-vat treatment and to reduce the depth of shade of cellulosic fibers which have been overdyed with direct and vat colors.

On the other hand, aqueous solutions of PVP have a powerful affinity for dyestuffs that contain a phenate or sulfonate grouping in solution, namely vat, sulfur and direct colors. This binding results in a very stable cation-anion complex between the polymer and the soluble dyestuff. The affinity is so great and the dyestuff is held so firmly that there is no simple way known to release the color to dye the cellulose fiber once the complex has formed. Studies are in progress to find a practical method of breaking this dye-PVP complex, but until this is accomplished PVP cannot be considered too suitable as a leveling assistant for these dyestuffs. Some work has indicated, however, that it can be used in certain applications to control rate of dyeing, and this promises to be an interesting development.

STRIPPING VAT AND SULFUR DYEINGS———A hot blank vat bath prepared with sodium hydrosulfite and caustic soda is used for stripping vat dyeings and prints or sulfur dyeings to which the PVP is added as the final component. This sequence is necessary as the PVP is precipitated by strong caustic soda. A practical general stripping formula follows:

PER 100 GALLONS WATER	
lb	
2.5-5	caustic soda flakes
4 -6.5	sodium hydrosulfite
1.5-3	PVP, 30%-active soln

The goods are treated for 30 to 45 minutes at a temperature of 170 to 185°F or higher and are then rinsed with a solution of 1 to 2 pounds of sodium hydrosulfite per 100 gallons in the first rinse bath, followed by additional water rinses.

Time and temperature of treatment are variables which should be adjusted to meet the specific stripping requirements. In many cases it will be found that the most pronounced effect will be obtained by decreasing the time of treatment and increasing the temperature of the bath to or near the boil. The known stripping resistance of the dye involved, the sensitivity of the particular leuco compounds to elevated temperatures, and the depth of shade will be influencing factors. With deep shades particularly, the extent of the reduction in color depth depends upon the amount of PVP present in the stripping bath. Generally, the greater the amount, the better is the stripping effect, but the concentration, even for dark shades, should not exceed three pounds of 30%-active PVP to 100 gallons, otherwise there is danger of precipitation in the bath from supersaturation with PVP-dyestuff aggregates, which may be deposited on the fiber. Rather than employing more concentrated solutions, a longer liquor ratio between the fiber and processing liquor is the recommended procedure in order to make more PVP available to complex the dyestuff solubilized by the reducing agent.

Packaged dyed yarns can be stripped in circulating equipment by using the above formula and the same time and temperature conditions. Liquor ratios of 1:8 to 1:15 are satisfactory. In stripping on a jig, where the liquor ratio is shorter than 1:8, the following stripping formula should be used:

PER 100 GALLONS WATER	
lb	
8-10	caustic soda flakes
10-12	sodium hydrosulfite
3	PVP-30% active soln

The fabric is given four ends on the jig at 180°F or higher and finished as previously described. In stripping heavy shades in a short liquor ratio, such as in jig application, the addition of 1 to 2 pounds of lignin sulfate per 100 gallons of PVP stripping bath will aid stability.

STRIPPING DIRECT AND DEVELOPED COLORS———Many direct and developed colors are readily destroyed by reduction or oxidation, and the addition of PVP will show little advantage. The usual hydrosulfite-caustic soda strip or chlorine bleach will be found satisfactory for this type of work. However, many colors which have been produced with partly or nondischargeable dyestuffs can be stripped to a considerably greater degree when PVP is added to the reducing bath. The following formula should be considered when direct or developed colors resist stripping by conventional methods. Best effects will be obtained at temperature near or at the boil.

STRIPPING BATH	
4% owf	zinc formaldehydesulfoxylate
2% owf	formic acid, 85%
3 lb	PVP, 30%-active per 100 gal

PVP is an excellent aid when overdyed shades on yarn or piece goods must be reduced in depth without altering the general shade character of the original color. A simple hot-water treatment with an addition of 3 pounds PVP, 30%-active, per 100 gallons of water is effective. By treating the overdyed materials for 20 to 30 minutes near the boil, the direct or developed dyestuff migrates from the fiber into the bath, where it is irreversibly bound to the PVP. This action can be accelerated by the addition of 1 to 2 pounds of soda ash to 100 gallons of water.

Because of the direct-dyestuff-binding properties of PVP, it must not be assumed that printed discharges on direct-dyed grounds will be improved by adding it to the print paste. PVP operates only in an aqueous solution, and its action is entirely inhibited when introduced into colloidal print thickenings with high solids content.

PVP IN RAG STRIPPING———The paper trade uses a wide variety of dyed and printed rags in the production of fine-grade papers and therefore has many more problems in stripping than have textile mills. This results from the wide variety of dyestuffs involved in a given assortment of rags and their consequent variable response to stripping. An additional difficulty is that, whereas most textile stripping is followed by redyeing, the stripping of rags demands a higher percentage of color removal if they are to be used in the manufacture of either white or light-toned papers. PVP can be used to advantage in meeting these extreme stripping requirements, and, when added to the average paper-mill rag-stripping formula, rag stock is decolorized to a greater degree than is possible with other stripping aids.

Normal procedure is to cook the rags under pressure for several hours in a short liquor containing caustic soda or soda ash, sodium hydrosulfite, quick lime and/or sodium sulfide with a wetting assistant. The addition to this basic stripping formula of 0.5 to 1.0% of 30%-active PVP owf shows a noticeable improvement in decolorizing rags graded as "difficult to strip". Stripping is further improved to a marked degree if the total time period of, for example, a 6-hour treatment is replaced by three 2-hour treatments with the same formula.

With rags containing a sizeable percentage of highly resistant vat-dyed remnants, an increase of up to 2% of 30%-active PVP owf (on weight of rag fiber) with longer periods of treatment may be required. The following formula and procedure has been found one of the most effective in such cases:

PER 1000 LB RAGS

lb	
20	caustic soda flakes
40	sodium formaldehydesulfoxylate
8	lignin sulfate
20	PVP, 30%-active
add water to give a liquor ratio of 1:5	

Cook under pressure for 4 to 6 hours, blow-down to atmospheric pressure, drain and rinse without admitting air into the cooker. Repeat the treatment and follow with the following:

PER 1000 LB RAGS

lb	
20	caustic soda
20	sodium formaldehydesulfoxylate or sodium hydrosulfite
1	PVP, 30%-active

Cook for 4 to 6 hours and finish as above.

It is obvious that no single stripping formula can be expected to give maximum decolorizing of any and all rag stocks. It is therefore recommended that small-scale trials be made to determine the type and degree of stripping required in each case. The inclusion of PVP in the basic formula and procedure selected can be expected to show a major advantage in stripping efficiency.

POTENTIAL USES ——— The monomer, namely, vinylpyrrolidone, has potential value for altering the dyeing, physical and chemical properties of acrylic fibers if copolymerized with the acrylonitrile. Such copolymer-type fibers undoubtedly would show a higher affinity for vat and sulfur dyes because of the complexing power exhibited by PVP to these dyes. The writers are aware that such fibers show greater acid-dye receptivity but believe the vat-dye aspects require further investigation.

It has been reported in the literature *(3)* that PVP has excellent adhesion to glass. This property has given impetus to investigating the polymer as a finishing agent for fiberglass. It has potentialities for this application, also as the monomer by copolymerizing with other monomers to alter the physical or chemical properties.

CONCLUSION

We have covered many practical uses of PVP, a versatile and extremely interesting acetylene compound, and have outlined briefly some of the possible ways in which may be utilized by industry to improve a product or process.

We are indebted to the GAF Central Research Laboratory, Easton, Pa, to the Commercial Development Department of GAW and to Antara Chemicals Division of General Dyestuff Corporation for much of the material presented here, and take this opportunity to thank the many individuals who have contributed.

REFERENCES

(1) Braeuer, M, "Albigen A, a new textile auxiliary with affinity for dyestuff", *Melliand Textilber* 32, 30, (June, 1951).
(2) Wurzschmitt, B, "Classification and qualitative investigation of surface-active substances", Fresenius' *Zeitschrift für analytische Chemie* 130, Vol 2, No 3.
(3) Schildknecht, C E, "Vinyl and Related Polymers," John Wiley and Sons, Inc, New York.

DISCUSSION

Question: Does PVP act as a good plasticizer for other things?

Answer: Yes.

Q: Can it be used in the new fibers?

A: I think it can be used in most of the newer fibers; but that is something that will have to be investigated further.

Q: Can it be used in acetate fibers?

A: There is no reason why it couldn't be used in acetate fibers. In fact, I think some of the acetate manufacturers are investigating it for that use at present.

PHOTOS OF WESTERN NEW ENGLAND SECTION MEETING

DECEMBER 11, 1953—SHELTON, CONN

1953 Annual Convention
Hosiery Group——

COLOR DEVELOPMENT AND ITS RELATIONSHIP TO FASHION*

HELEN SISSON
Phoenix Hosiery Company

ONE hundred seventy million free from toil. The Twentieth Century has brought a big change not only in the way we live but in the way we see life. Today in America the miracle that was implicit in the Industrial Revolution has taken place. One hundred and seventy million people are free from endless toil for a bare subsistance and can enjoy their leisure in any way they see fit.

Contemporary level of living. I am not presenting Utopia; I am very much aware of the many economic and social problems which confront our civilization. But the fact remains that never before have so many people lived on so high an economic level with so much free time in which to enjoy life. It is this contemporary level of living and enjoyment of life which presents an ever-growing challenge to the alert industrialist.

Importance of the New Vision. We are all aware of the Industrial Revolution and our machine age which has followed it. But we are only beginning to become aware of the visual revolution that has come in its wake and is only now in the mid-twentieth century making itself decisively felt. It is of the visual revolution that I shall speak this morning, for this new vision is vital to our time. Indeed, to work intelligently today in any of the fashion fields (and less and less exists which is not touched by fashion) we must understand the forces that are at work.

Freedom from Feudalism. In order to understand these forces let us review a little history. The Industrial Revolution really marks the breakup of feudal society in Western Civilization. It began in the inquiring minds of the Renaissance men who, emerging from the Dark Ages, began to investigate the universe and to make practical application of their discoveries. These discoveries led to the wonders of a century ago. The effect of these inventions was to free Western society, but the greater part of the world is still in the process of freeing itself from feudalism. It is the effects of the Industrial Age on our lives here in America which concerns us here today.

H Sisson

The Twentieth Century has brought a big change not only in our way of living but in the way we see life. Modern art and architecture, the movies, technicolor, the airplane, television and now three-dimensional movies and the promise of color television have developed vision and awakened a mass demand for color, texture and form in the most utilitarian objects. Color, therefore, is no longer the exclusive possession of the fine artist. It is the tool of the designer, the artisan, the scientist and the industrialist. A working knowledge of color is essential to the development of any product from hosiery to automobiles. Color sells Mr and Mrs Consumer and what Mr and Mrs Consumer buy multiplied by 170 million is fashion. The workings of fashion are no longer secret but science. Fashion trends when spotted, watched and capitalized on can grow into a tidal wave. Since the War, a totally new kind of color trend has been developing and is building a whole new world of fashion. Everyone connected with the fashion industry should acquaint himself with this color trend and the new kind of vision which is responsible for its growth.

New vision began with modern artists. This new vision, which was to become as much a part of our industrial era as the Machine itself, had its beginning over a century ago in France where a group of artists were born during the first generation of the machine age. Two world-shaking events lay immediately behind these men, the French Revolution and the Industrial Revolution. It isn't an easy matter to explain the artist but I will try. He is a man of tremendous sensitivity who performs the function of priest, philosopher and scientist. It is the artist who interprets life for us not as we see it but as he sees it. He may be decades ahead of his contemporaries in his conception.

This group of artists intuitively felt the changes that were coming about in life though they were not then obvious to their contemporaries. They saw mankind being freed from the old stigma of slavery and want. Is it any wonder then that these men saw the universe not in terms of darkness but of light? And they painted this light on their canvasses. Like the scientists of their time they broke light into its component parts, and the full color spectrum of sunlight flooded their pictures. These artists became so concerned with the atmosphere that they were called Impressionists, and their paintings expressed for the first time the love of modern man for nature. This love of nature could not come until man was free. (Slides.)

Modern Art Movement. A century of tremendous art vitality followed these first painters. The Impressionists were followed by the Postimpressionists, who, inheriting that marvelous discovery of the spectrum, began using it not to paint atmosphere but to paint form. Cezanne, giant among modern painters, is of this group. This breaking up of form into colors led to the Cubist painters. The reaction to the Cubist analysis of form then led to the Expressionist painters, who related color to the emotions. Van Gogh and Gauguin are of this group. And so movement followed movement—Realism, Surrealism, Symbolism, to mention a few. The point I want to bring to you is that each group of artists saw life in new terms. Their paintings were tremendously shocking to the people of their time. (Slides).

* Presented at the Conrad Hilton Hotel before the Hosiery Symposium on Friday. Sept 18, 1953, in Chicago.

Early Twentieth-Century developments. In America the machine era was progressing at an ever-accelerated rate of speed. The automobile began to replace the horse and buggy soon after the turn of the century. Then came the movies bringing a larger visual world with them. The first World War speeded the development of aviation, and after the war the modern era really began to hit its stride. Women who had left their housekeeping during the first World War to take over the jobs vacated by men never returned to housework en masse. Instead, they took whatever jobs were available to them in business and industry. Women had also won their political freedom, and with equal rights and paychecks the American Woman began to be a force in every phase of American life. If this new audience of women had not come into being, I would not be talking to you this morning and you indeed would not be sitting here because there would be no mass fashion market.

Growth of vision in the Twentieth Century. With the Twenties the new vision really began to hit its stride. Many things happened in rapid succession. Hollywood became the glamour capital of the world, the automobile became a family commodity, commercial aviation began to grow. Advertising, which sold the first World War to the nation, began to apply its visual techniques to a new audience. Modern art and architecture, which had been identified with Europe, began to be seen in this country, and the work of Louis Sullivan and Frank Lloyd Wright, both Chicago architects who first received fame in Europe, were imported to America.

Staple colors over-thrown. The sum total of all this experience was to change people. This change was felt by both manufacturers and stores. Up to this time color was regarded as a staple. There was always a good black, a navy and several lighter blues, a brown, tan, Kelly and deep green in the stock. Brown was primarily for the redhaired, blue for the blue-eyed, black for elderly ladies and red—well red was a *fast* color and I don't mean color fast! This new audience of women filled with ideas they'd seen in the movies and aware of their new freedom were bobbing their hair, using lipstick, driving automobiles. They wanted new colors also to express the excitement of life.

Fashion changes of the Twenties. A group of promotional-minded French designers were much aware of the change that was coming into modern living. They designed entirely new clothes for this growing fashion audience in America. Chanel created the famous sheath dress, Vionnet the bias cut, and Patou launched fresh new colors. Some color hits of the Twenties were Bois de Rose, Tengerine, Perriwinkle and Taupe, but, by and large, black was the outstanding fashion color of the Twenties. It was a period of silhouette experimentation—skirts went up and then down to the ankle, all in one year. By 1925 skirts really went short to the knees and stayed there until their sudden drop in 1929. It was during this period that women's legs became part of fashion and good stockings (silk, of course) became essential to the appearance.

Development of color in the Thirties. The Thirties witnessed an even greater development of the new vision. As the depression deepened, merchandise had to have the ultimate in attractiveness in order to sell. The single, greatest technical achievement in color during the Thirties was the advent of technicolor in the movies. Acceptance of color became so paramount that even Henry Ford had to change his merchandising. Heretofore his fabulous business had been built on the premise that all one needed in order to sell more automobiles was to build them as cheaply and as dependably as possible and to paint them black. During the Thirties we began to watch the Fords in color go by.

The harmonizing of colors began to be a fashion theme, both in home furnishings and ready-to-wear. Matched-accessory departments sprang up even in the small stores throughout the country so great was the desire to be color co-ordinated or matched up. This was the first era of the big headaches for dyers. In my own field of apparel (and I was the fashion co-ordinator for a big store) silks had to match woolens, handbag leathers had to match shoes, leathers, felts had to match woolens. Business was too hard to get to refuse to try anything!

Because of the wider acceptance of color in the Thirties, modern painters began to have a growing audience. The Museum of Modern Art in New York became popular. Its one-man exhibit of the paintings of Vincent Van Gogh in the Mid-thirties was a public sensation. Here were paintings whose colors were charged with emotion, and people understood them. The Van Gogh exhibit was loaned to leading art museums from coast to coast and viewed by thousands. A Fifth Avenue store was quick to capture the enthusiasm. Their entire facade of Fifth Avenue windows blazed with reproductions of the Van Gogh canvasses with fashions in the foreground carrying out their color harmonies. This was the first fashion use of the modern artist's palette.

Development of color as science. One more color development during the Thirties was in progress and, although unknown to the consuming public, was to be of great importance in the post-war era. I refer to the development of color science and I could not possibly speak about color in Chicago without paying tribute to the Chicago Color Society of the Thirties. It was as a part of this group that I heard my first lecture on the Ostwald Color Solid given by Dr Egbert Jacobson of the Container Corporation of America. I heard him give such inspiring statements as these: "Science and Art are one." "Harmony equals order." Systems like the Ostwald, Munsell and derivative systems make it possible for the artisan, designer and the industrialist to use color as a science. Color is no longer the exclusive possession of the so-called fine artist—it has become a tool in the hands of industry and especially in the hands of the fashion industry.

Fashion pent up during World War II. The second World War broke the decade of the Thirties away from the Forties so far as fashion development was concerned. During the war years the uniform was fashion, and civilian colors were pastels in order to save all the valuable dye chemicals for vital war supplies. Nylon hosiery was introduced in limited quantities in 1939 but was still in short supply when the war took over nylon along with other valuable commodities.

Rapid visual strides in Post-War Era. Since the end of the second World War visual development has continued to make rapid strides. In one short decade airplane travel has become more commonplace than boat or train travel. Flying to Europe to the resort places of the world has become the rule, and boat travel a luxury. This brings all parts of the world incredibly near. The United Nations in their modern building on New York's East River is a visual reminder that modern architecture is here to stay and that the world is working together. Television aerials raise their futuristic antennas from coast to coast in country, town, hamlet and congested city alike, and now there is the promise of color television! The movies have sagged but Cinerama is born and movies all over the country are going third dimensional.

In the Cold War which has followed the Hot One industry has kept at wartime pitch, employment has reached a "high" not known even during the War, and with this high rate of prosperity the new Golden Age of Color and Texture is being born. Women, young and old, married and single, beautiful and plain, independently wealthy and dependent on a week-

ly paycheck are working at every kind of job imaginable. And this woman with a weekly paycheck comprises the single, most important consumer audience in the world. Manufacturers study her, retailers cater to her, top-flight magazines have been created exclusively for her and all others bid for her dollar. This composite working woman knows more about herself, about what she wants than any consumer audience has ever known about itself. And she is constantly reaching out to learn more.

Color challenge to dyer and stylist alike. Are we as manufacturers and dyers and stylists ready for this new era of fashion possibilities? I believe we are. But we must have a wider and deeper knowledge than ever before to measure up to the challenge of Mrs Consumer today! Our field is color—and today we are in a fashion era where color and texture predominate. You as dyers have the magic world of the test tube in your laboratories, and you can make a mere stylist blink her eyes at the wonderful things you can do. Aniline leathers, Chromspun fabrics, fluorescents and iridescents are only a few. As an example I shall show you the wonderful "flash-fire" Christmas stocking Mr Al Olsen, head of the Dye Laboratory at the Phoenix Hosiery, presented to me several seasons ago, and I asked Al only for a red stocking!

Fashion colors harmonize. Color is a wonderful world to be part of today. It is fascinating to watch it grow bigger with every year. Since every fashion season is built logically upon the last one, let me show you two charts representing the fashion colors of spring and fall 1953. All these colors have been measured according to the Ostwald color standard of twenty-four hues. The colors which form concentric circles are woolens, silks, cottons and leathers of the current fashion market. Right before your eyes you can see what is happening! The entire fashion market is moving in color harmony, just as truly as if it were painting a picture. This fall's colors may be pitch or pale, vivid or soft, but Mrs Consumer will have no problem matching or blending them to her costume, for stylists and dyers have worked together to harmonize colors in advance.

Fashion colors the year round. Another trend is apparent from the two color charts. Color families are year-round. The change between the two circles is a subtle one—spring colors are lighter in key, fall colors are deeper in pitch, but the same color families are represented on each. This can mean only one thing—that today women have discovered that color flattery knows no season.

Hosiery colors still nondescript. This then is fashion for the year 1953, and hosiery as you all know, is considered a fashion accessory. Yet hosiery colors shown by manufacturers and stores are limited to three or four, and women are still walking around with the bare-leg look, the no-color look and the one-color look (beige).

A color program for hosiery. Why, we reasoned, when fashion presents a beautifully harmonized year-round range, should hosiery colors not reflect this trend? Why should we let the modern woman be so conservative about discovering the positive quality of her legs when she has learned the art of make-up, of hair coloring and of dressing in attractive colors? Our answer to this challenge is the hosiery display I have set up here on the table beside the color charts. We think there is nothing more handsome than sheer nylons in soft shadowy fashion colors—on or off the leg. A year ago after several years of experimentation the Phoenix Hosiery Company originated the program of color-cueing, color-boxing and color-displaying its ten harmonized colors to stores so that Mrs Consumer couldn't resist them. This method has been so successful as a means of selling hosiery color to her that other manufacturers are following suit. It now looks as if color keying and color packaging would become standard equipment in selling color harmonized hosiery to women.

The reported shortening of skirts won't do the Hosiery Industry a bit of harm. Neither has the movie *Moulin Rouge* and the Broadway hit *Can-Can*. But are we to be satisfied with this first step? The world of texture plus color for hosiery is still unexplored. I have brought the Phoenix textured stockings Tweed and Twill here to show you this morning, for they illustrate what can be done with both color and texture. This is just the beginning. In our ever-enlarging world of vision there are no limits.

Future vision. It's been a long half hour —from the Industrial Revolution to the mid-twentieth century! We travel fast these days. It will no doubt be a considerable time before women will look like Picasso's famous one-eyed woman. (Slide). As I told you earlier in this paper, the artist is always ahead of his contemporaries. Some scientists, however, are saying that eyes are actually growing closer together. Perhaps this evolution to the single eye will bring the world together mentally as well as visually. Be that as it may, we shall not be satisfied until the whole world awakens to the beauty of color, for color is life.

THE APPLICATION OF VAT DYES

"The group of fifteen editors responsible for this monograph consists of a well-balanced cross-section of American industry concerned with the production, marketing and application of vat dyes. The AATCC is to be congratulated on the production of a comprehensive survey of American vat dyeing and printing practice which is the major theme of this application . . . the book will be useful as a work of reference at this side of the Atlantic and as a working manual for the American colorists for whom it was designed. . . . If a clear account of American practice is required . . . the enquirer *must* have access to this volume".—*JOURNAL OF THE TEXTILE INSTITUTE* (England).

"This book . . . is abreast of the latest technical developments and research. Its value is increased because of the lack of books in this field today . . . we can readily recommend this book to all technical and practical men".—*MELLIAND TEXTILBERICHTE* (Germany).

Monograph No. 2 of the

American Association of Textile Chemists and Colorists

The price of "The Application of Vat Dyes" is $5 per copy, postpaid, to members; to nonmembers it is $6 per copy. Send your check or money order to the

SECRETARY AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

P O BOX 28, LOWELL, MASSACHUSETTS

"This monograph contains the work of many mill-experienced authors, plus good, sound chemical and application principles developed in the laboratories and mills enjoying AATCC membership. . . . This book puts between two covers much information that a dyer is constantly searching for. It is a good investment for any laboratory, dyehouse, or printshop."—*TEXTILE WORLD*.

". . . this monograph should be in the hands of every user of vat dyestuffs, every student and every teacher. The book is well indexed and includes valuable lists of equivalent trade names. It will certainly take its place as a standard book of reference".—*JOURNAL OF THE SOCIETY OF DYERS AND COLOURISTS* (England).

ABSTRACTS

Isocyanates and Their Modifying Effects on Other Textile Polymers

J A Somers, *British Rayon & Silk J* 30, 62-3, November, 1953.

Isocyanates are a versatile class of organic substances, particularly in their textile applications. They may form the basis of textile auxiliaries, of new types of permanent finishes, or of new fibers themselves. In their textile applications the alkyl isocyanates are useful not so much on account of their own properties as because they are very reactive towards the hydroxyl and amino groups present in most fibers. Thus these isocyanates can be easily caused to react and chemically combine with cellulose, protein, and other types of fibers sufficiently to produce a distinct modification of their normal properties, with the significant added advantage that such modification is usually permanent and reasonably fast.

For example, in cellulose fibers such as cotton, viscose, and acetate rayon, the hydroxyl groups can react with an alkyl or aryl isocyanate. Many years ago it was discovered that in so reacting with phenyl isocyanate, cellulose was converted into the ester of phenyl carbamic acid. As is now well known, the higher alkyl groups, say C_{10} to C_{18}, are strongly hydrophobic, and so, by applying to cellulosic fibers decyl-, hexadecyl-, octadecyl-, and similar isocyanates, it is possible to produce a permanent water-repellent finish.

If acetate rayon fabric is impregnated with a benzene solution of hexamethylene di-isocyanate, and is then heated at 140-145° C for one hour, it loses its solubility in acetone and becomes so much hardened that it can be ironed at 280° C without fusing.

Alkyl and aromatic isocyanates can also be employed to give increased stability to mechanical finishes on fabrics of all types, particularly cotton and viscose rayon. For example, calendar finishes, including schreinering and embossing, retain their original appearance only so long as they are kept dry: with the first complete wetting the finish is largely lost. By suitable treatment with the organic isocyanate, preferably a di-isocyanate, this wet swelling can be much reduced, and the mechanical finish is thus made faster to wetting and even to hot soaping treatments. Pleating in viscose fabrics is made permanent and comparable with the effects obtainable with the synthetic fibers.

The use of organic di-isocyanates as a basis for the production of synthetic fibers has an outstanding example in Perlon U, made from a polyurethane, which in turn is made by condensing hexamethylene di-isocyanate with tetramethylene glycol and then polymerizing. WHC.

Wool Research and the Launderer

Anon (from the International Wool Secretariat, New Delhi), *Indian Textile J* 63, 766-8, September, 1953.

Nowadays scientists have gone far towards making wool virtually unshrinkable. But whatever degree of shrink-resist they give to it, careful laundering is still essential to prolong the fiber's life.

As launderers perhaps know, shrinkage of untreated wool when washed can result from two causes: *relaxation* and *felting*. Relaxation may arise as the result of a garment becoming stretched in any way while moist during manufacture and being allowed to dry when in this extended condition. It will retain the stretch until it is wetted again, when it will return to its original size. To escape this type of shrinkage, the user must clearly avoid getting the fabric wet.

In these circumstances, it is obvious that the ideal cleansing technique is dry-cleaning with solvents, care being taken to avoid the aqueous soap additions which are sometimes made to the solvents used. Washing, however, is desirable for such items as socks and underwear, where soiling must be removed by laundering.

Felting—the matting together of the fibers—is due primarily to the fiber's surface structure of overlapping scales. In the presence of moisture, the fibers "creep" when rubbed and compressed, thus producing entanglement and shrinkage of the yarns. Thus the material becomes felted—the type of shrinkage that affects launderers most of all. Scientists can now counter this felting tendency to a great extent. Various techniques have been evolved which minimize the "differential friction" by modifying the fiber's surface.

The "Lanfix" peroxide-copper treatment of the British Cotton and Wool Dyers Association is described by the author. The wool is first steeped in a weak copper sulfate solution for ten minutes at 70° C, and is then treated with hydrogen peroxide for an hour at 50° C. This process is said to produce high shrinkage resistance, a better white, and more level drying.

The "Perzyme" process, patented by the Wool Industries Research Association in Yorkshire, is also described. The wool is first treated with hydrogen peroxide and is then transferred to a second bath containing papain (the dried juice of the paw-paw tree) and sodium bisulfite. Papain is an enzyme or ferment which can dissolve proteins such as the wool keratin. It has a gentle action which confines the attack to the outer surface of the fiber.

Various chlorination methods are also described, including a process patented by Wolsey Ltd, which uses a combination of sodium hypochlorite and permanganate in alkaline solution, and a dry gaseous chlorination treatment which was used extensively on service wool clothing during the late war.—WHC.

Progress in Dyeing the Newer Synthetic Fibers

P J Choquette, *Textile Age* 17, 24-9, December, 1953.

The properties that make the newer synthetic fibers so valuable have contributed to the difficulty of dyeing. Their hydrophobic character, resistance to chemical agents, limited swelling properties and smooth surfaces all make difficult the penetration and retention of dye particles. Higher temperatures or the use of carriers have been found necessary to diffuse dye into many of the newer synthetic fibers. It is believed that such methods will continue to be required and that in fact they have already attained the status of commercial production.

The degree to which individual fibers respond to higher dyeing temperatures varies. In some cases, this temperature may be limited by excessive shrinkage or a harshening of the fiber. In general, however, even in those cases where dyeing is carried out on conventional equipment, the importance of obtaining temperatures above 250° F is emphasized, and advantages are noted for temperatures up to 212° F. For this reason, the use of closed jigs or kettles which permit temperatures up to 208-210° F is recommended.

High-temperature dyeing is, however, normally understood as the operation carried out in closed pressurized equipment, where temperatures up to 250° F are obtained. The Thermosol process utilizes dry heat treatments up to 400° F. This method has been considered for the continuous dyeing of filament Dacron, and utilizes the steps of padding, drying, heat setting, and washing. The Barotor Pres-

surized Fabric Dyeing Machine permits the batch dyeing of piece goods at temperatures of 250° F. The Uxbridge Finishing Co. machine was designed to handle piece goods continuously at 250° F. Molten-metal dyeing offers interesting possibilities also.

The author summarizes the effect of high-temperature dyeing on the various fibers as follows:

Dacron (disperse dyes, 250° F): excellent color value and penetration.

Orlon 81 (selected basic dyes, 250° F): excellent color value and penetration; (vat dyes, 250° F): improved color value and penetration.

Orlon 42 (acid colors, 230° F by cuprous-ion method): larger range of dyes and better wet fastness; (vat dyes, 230° F): bright shades of excellent fastness.

Dynel (disperse dyes, 215-220° F): shorter dyeing period and improved penetration.

Acrilan (chroming top-chrome acid dyes, 250° F): more rapid and complete chroming; (vat dyes, 230-240° F): improved color value and penetration.

Wool (acid and chrome dyes, 225° F): shorter dyeing time.

Nylon (neutral-dyeing premetallized dyes, 250° F): improved penetration and outstanding washfastness.

The author also discusses the effect of the addition of certain carriers in dyeing Dacron; the cuprous-ion method employed in dyeing the acrylic fibers; and the improvement of Orlon 42 over Orlon 41 from the dyeing standpoint.—WHC

"Terylene" Polyester Fiber in Canada

B P Ridge, *Canadian Textile J* 70, #23, 57-9; #24, 58-61, #25, 65-7; #26, 68, 71 (1953).

This is a series of four articles dealing with the origin and history of "Terylene" (the British equivalent of "Dacron"); the properties and processing of the fiber; dyeing and printing; and end uses for apparel, furnishings, and in industry. A plant for the manufacture of Terylene is now under construction at Millhaven, Ont.

The production of the fiber from ethylene glycol and the dimethyl ester of terephthalic acid is described in some detail.

Among the outstanding qualities of Terylene are its great strength, both wet and dry, high modulus of elasticity, low moisture regain, and excellent resistance to light, bleaching agents, and common acids.

Heat-setting (up to 150° C) is recommended if the fabric is to be dimensionally stable. This not only minimizes shrinkage but reduces the tendency to crease and wrinkle in boiling water.

Terylene can be dyed either with dyestuffs of the cellulose acetate disperse type or with certain of the azoic combinations, using a modified technique (applying the amine and coupling component as dispersions, either combined or in successive baths, and diazotizing hot). B-oxynaphthoic acid is the most satisfactory developer for coupling.

In the normal dyeing of Terylene the dyebath should be maintained at a vigorous boil, which means that closed jigs, package, or winch machines are the most satisfactory. The rate of diffusion into the fiber is very slow. An addition of an antistatic agent to the last rinse is recommended.

The rate of diffusion into the fiber is also a controlling factor in the application of dyestuffs to Terylene in printing, and even with the most readily applied disperse types, prolonged steaming is necessary at atmospheric pressure if acceptable depths of shade are to be obtained. By steaming at higher pressures, however, the time required decreases as the pressure is raised, and even vat dyestuffs, which yield only the palest shades under ordinary conditions, may be successfully applied at pressures up to 20-40 psi.

As swelling agents to assist dye diffusion, p-hydroxydiphenyl and resorcinol are said to be effective. Sodium alginate is recommended as a thickener for screen printing, and thickenings of high solid content for roller printing.

Among the end uses described by the author are men's socks, underwear, shirts and suits; dress goods and lingerie; lace curtains, furniture coverings, tablecloths, etc. Industrial uses include filter cloths, fishing nets, fire hose, and work clothing. The fiber's resistance to mildew and bacteria is an advantage for tropical use. —WHC

Microbial Damage to Animal and Vegetable Fibers and its Identification and Prevention

M Nopitsch, *Ciba Rev* 100, 3581-92, 3600-09, October, 1953.

This is a highly interesting series of four articles. The first covers the microbial degradation of wool and other animal fibers. The bacteria which attack wool are described, and their effect on the wool fiber is illustrated by photomicrographs. The author points out that the spores of bacteria, especially of those living in the soil, spread everywhere, the essential conditions for their growth being moisture, relatively high temperature, and an optimal pH value (8-8.5) in the alkaline region. Below pH 7.0 bacterial action is much reduced.

The second article covers microbial damage to vegetable fibers, caused by certain groups of mold fungi. Textiles attacked by molds emit a musty, stale odor, and usually exhibit spore or mold spots of varying size and mostly circular shape. Their color may be yellow, orange, red to purple, green, brownish olive, or dark brown to almost black. Under the quartz mercury lamp they often appear highly fluorescent.

The different types of mold fungi (*Aspergillus, Penicillium,* etc) are described, and the damage produced by each, not only to the cotton fiber but to starch, sizes, and finishing agents, is tabulated.

The third article describes the identification of microbial damage and the culture methods employed. Several stains are recommended to distinguish between the various types of bacteria. In the majority of cases, examination under the microscope is followed up by a number of culture tests. The most important culture media for growing micro-organisms are listed. The author also describes a method for testing the effectiveness of a bactericidal or bacteriostatic finish.

The final article describes various preventive treatments. The author mentions particularly the use of chrome, which increases the resistance of wool to certain bacteria. Mothproofing processes also provide protection against these types. Antiseptics naturally offer more or less permanent protection, and tannins and copper and mercury salts have a similar effect. Adjusting the wool to a low pH (less than 4.5) is another protective measure. Vegetable fibers readily infected with spores require a fungicidal finish. Zinc, copper, and mercuric salts are specially recommended for this purpose, as well as a long list of organic compounds. Modifying the cellulose chemically (e g, by acetylation) also makes it resistant to mold.—WHC

New Problems in Garment Dyeing: Dealing with Unions Containing the Man-Made Fibers

B Kramrisch and F Grainger, *Dyer* 110, 751-7, November 13, 1953.

Very few garments handled by the garment dyer consist of one fiber only. Usually the stitchings, butonholes, or linings introduce a second or even a third fiber. In consequence, the garment dyer is faced with difficulties not met with when the original fabric was dyed. Moreover, there are fundamental differences in worn textiles, compared with virgin textiles, which add to the difficulties of the garment

dyer. Light, perspiration, and the use of deodorants are just a few examples of agencies which may markedly alter the affinity of the fibers in the garment for dyestuffs.

The basic textile fibers such as cotton, linen, wool, and silk are still the main considerations of the garment dyer, but the advent of viscose and acetate rayons presents new problems to him, and still greater difficulties are to be encountered as a result of the introduction into the textile field of man-made fibers such as regenerated proteins (e g, Ardil and Fibrolane) and true synthetics such as nylon, Terylene, Orlon and Dynel.

The authors have outlined useful procedures for dyeing unions of wool with cotton or viscose, acetate, nylon, Ardil, and Fibrolane; cotton or viscose with acetate, nylon, Fibrolane and Ardil; nylon and acetate; linen and silk; Terylene with cotton or viscose; and Dynel with cotton or viscose.

Suggestions are made for dyeing faded garments when the fiber has been degraded by the light exposure. Where stripping is necessary, particularly on badly faded garments, hydrosulfite compounds are commonly used, particularly when wool is present. The authors also recommend Neovadine AN for stripping wool, and state that one advantage is that no change in tone occurs during the stripping. As might be expected, different wool dyes differ in the degree of stripping produced.—WHC

Experiments on the Continuous Dyeing of Wool, with Special Reference to the Standfast Molten-Metal Technique

M R Fox, I Seltzer, and C Preston, *Dyer* 110, 721-2, November 13, 1953.

Wool dyers have rarely ventured into the field of continuous dyeing, for several reasons, e g, scarcity of dyes with power of rapid fixation; variability of the wool fiber in absorbency, wettability, and dye affinity; difficulty of handling wool fabrics in continuous length (danger of distortion, warp-wise elongation, and filling-wise shrinkage); and rather conservative organization of the trade.

There are several fields where continuous wool-dyeing methods would be profitable; e g, the dyeing of slubbing, carpet yarn, and woolen and worsted piece goods.

The authors describe trials made with acid and vat dyes on wool piece goods in the Standfast molten metal machine, operating at 15-30 yards per minute at 90-95° C. Using acid dyes, they obtained the best results with the monosulfonated types in a neutral bath, with the addition of a nonionic ethylene oxide condensate, Lissapol N. They found that addition of acid to the bath set up a powerful reduction cell with liberation of hydrogen, due to the interaction of the acid and the alloy. The high-speed wetting efficiency of the Lissapol N, they state, contributes to the uniformity of the dyeing. After leaving the metal bath the cloth is passed through a Glauber's salt bath and is boiled for one minute in weak sulfuric acid.

Experiments with vat dyes are also described, but the results are not yet fully successful.—WHC

Moisture Relationships of Wool and Synthetic Fibers

Anon, *Textile Recorder* 71, 260, October, 1953.

This is a report of a study, made by Fabrics Research Laboratories, Inc, for the Wool Bureau, Inc, of New York, of the moisture relationships of fabrics made with different fibers and with blends of these fibers.

The study took as its starting point the relative importance of fiber properties and fabric geometry in the simple moisture relationships which control the comfort qualities and the convenience of fabrics made from popular fibers, namely, moisture absorption, wicking, water retention, and rate of drying. All these have an important bearing on the warmth, soiling, and comfort features of apparel garments.

In all-wool fabrics, even at complete saturation with water, air-filled spaces remain between the fibers, and as air has as much as twenty times the insulating value as that of the water which might replace it, wool fabrics, even when soaking wet, retain some of their insulation value. With wool socks this void space amounts roughly to 25 per cent of the void space between the fibers when dry. With nylon socks, however, about 90 per cent of the void space is taken up by water, while cotton, Dacron, Orlon, and Dynel socks take up enough water on saturation to fill the available voids completely.

Wool and Vicara fibers were the most absorbent of the apparel fibers tested; cotton had about half the absorption of wool, while nylon absorbed very little, and Dacron, Orlon, and Dynel practically none at all.

Wool socks feel dry when there is much more water present than in socks knitted from the nonabsorbent fibers. For wool the point of palpable dryness was found to be reached at 23-30 per cent regain; for nylon it was at about 5 per cent, for Orlon at 1 to 3 per cent, for Dacron at 0.7 per cent, and for Dynel, at 0.1 per cent regain. Cotton felt dry at 14 per cent regain, while blends of Vicara-nylon and wool-nylon felt dry when the regain reached 12 and 16 per cent respectively.

The low wicking or capillary action of all-wool fabrics was emphasized in the report. In fabrics made from nonabsorbent fibers the wicking was found to be extremely rapid. Wicking not only interferes with comfort but increases the tendency to soil accumulation by carrying the soil-bearing liquids into the inner structure of the fabrics, making its removal difficult.—WHC

Cotton as a Basis for New Textile Fibers

C F Goldthwait, *Textile Bull* 79, #10, 95-6, October, 1953.

The author, who spoke at the Second Chemical Finishing Conference sponsored by the National Cotton Council, stated that cotton is a "natural" for conversion to other fibers which will retain practically unchanged their original cotton textile form. Some have already been made commercially and are in current production. So far, the products are for specialty purposes, but experience with resins suggests that some of them may enter into chemical modifications to make new fiber products suitable for more general use. More specifically, while it is advisable to do exploratory work before venturing too far with predictions, it seems entirely possible to develop modified cotton or new cotton-type textiles more resistant to ordinary soiling, more readily cleanable, and with the much desired recovery from accidental creasing.

The author points out that while a finish like acetylation might double the cost of cotton, the net cost of the treated fabric would be less because its durability in certain uses would be increased five or ten fold.

He illustrated the way in which chemicals combine with cotton to change its properties, and suggested that an intriguing possibility would be the deposition of some elastic polymer in the voids of the cotton fiber to form an interconnecting system which might radically change cotton's properties (in other words, a synthetic fiber might be built up inside the cotton fiber).

Chemical reaction with cotton, the author said, usually is partial; that is, only the cotton cellulose most readily accessible to the chemical is reacted. However, the same parts of the fiber which are accessible to chemicals are also most readily subject to deteriorating influences. Therefore it is simply necessary in most cases to modify these available parts of the fiber structure to achieve the desired results. In some cases, the whole fiber may be converted to a new chemical, as in the case of the triacetate of cotton, without loss of the fiber structure. However, generally it is not necessary to react the cotton fiber to such an extent in order to achieve the desired modification.—WHC

NEWS

• Delegates Vote to Develop Minimum End-Use Standards

More than 50 technical experts representing several phases of the textile industry voted on January 15th to develop nation-wide minimum specifications and standards for the end-use of all textiles fabrics used in wearing apparel and household furnishings. The project will be based on L22, American Standard Minimum Requirements for Rayon and Acetate Fabrics. The decision was made at a general industry conference held in the offices of the American Standards Association.

The National Retail Dry Goods Association, which represents some 8,000 department stores, was chosen to provide administrative leadership of the project as sponsor. The NRDGA had originally asked the American Standards Association to call the conference.

Irwin D Wolf, general manager of Kaufmann Department Stores, Pittsburgh, and chairman of the NRDGA executive committee, presided at the meeting. In his opening remarks he stated:

> "It is our purpose to provide a means for a textile producer to promote fabrics conforming to such standards; to provide a garment manufacturer or the producer of a household fabric to offer for sale goods conforming to the American Standards; to provide the retail establishment with goods that it can promote and guarantee on the basis of satisfactory consumer use — and to provide our customers with the opportunity to buy textile products ensured against any premature failure."

Among the speakers who endorsed the project were: Charles W Dorn, technical committee, NRDGA, and chairman, Technical Committee on Research, American Association of Textile Chemists and Colorists; Dr Jules Labarthe, Senior Fellow, Mellon Institute; Ephraim Freedman, director, Macy's Bureau of Standards; Robert L Stutz, president, Better Fabrics Testing Bureau, Inc; J Robert Bonnar, president, American Association of Textile Chemists and Colorists; Genevieve Smith, representing The Mail Order Association of America.

• Additional Licensees under Avcoset Program

Hanover Textile Corp, A Steinam Co, Inc, and The Milton B Hartman Co are among the latest converters to be licensed by American Viscose Corporation to convert rayon fabrics under the Avcoset program of quality control of washable rayon fabrics.

• Wallace & Tiernan—Novadel Agene Merger Announced

Martin F Tiernan, Chairman of the Board, has announced that on January 1, 1954, the merger of the associated companies, Wallace and Tiernan Co Inc and Novadel-Agene Corporation, into a single organization known as Wallace & Tiernan Incorporated was completed. Stock of the new company is listed on the American Stock Exchange. Subsidiaries include W C Hardesty Co Inc, Richmond Manufacturing Company, Thomson Machine Co, Electro Rust-Proofing Corporation (N J) and Wallace and Tiernan Ltd.

It is anticipated that this merger of the Wallace & Tiernan equipment, engineering and pharmaceutical lines with the Novadel flour milling and chemical lines will give the new company a broader base, enhance stability and increase diversity of operations.

The new company's principal lines of activity include: Hardesty fatty acids and plasticizers; Wallace & Tiernan chlorinators, water purification apparatus, chemical feeders and materials handling equipment, processes for treating fresh produce, electrical specialties, lighthouse equipment, precision pressure-sensitive instruments and ethical pharmaceuticals; Novadel organic peroxides and equipment and processes for treating flour; Richmond sifters and separating equipment; Thomson bakery equipment; and Electro Rust-Proofing cathodic protection services.

Wallace & Tiernan is known in the chemical and plastics industry through its subsidiary W C Hardesty Co Inc, manufacturers of a wide variety of fatty acids and plasticizers. Operations of Hardesty will continue without change.

Principal plants are located at Belleville, N J; Buffalo, N Y; Geneseo, N Y; Dover, Ohio; Toronto, Canada and London, England.

• Dynel Spun with Color Passes AATCC Fastness Tests

"Color-spun" Dynel, Union Carbide's pigmented acrylic staple fiber, has "outstanding fastness properties", according to detailed results of experiments completed recently and made available by T A Feild, Jr, head of the Textile Fibers Department's development service laboratory at South Charleston, W Va. The experiments were conducted according to the test methods of the American Association of Textile Chemists and Colorists.

The basic tests, as outlined in the *1953 AATCC Technical Manual and Year Book*, include the No. 3 cotton wash test, dry cleaning, dry and wet crocking, acid and alkaline perspiration, and fulling. The eight colors subjected to the experiments were the standard Dynel shades of black, light blue, yellow, green, dark blue, gray, tan, and brown.

Other evaluations were also carried out to determine the effect of carbonizing, acid "Textone" bleaching, boiling water, dry heat and cross dyeing on the properties of the fiber. Lightfastness was run up to 140 hours in the Fade-Ometer.

Results of the latter test were particularly important, Mr Feild pointed out. He added that the green, brown, dark blue, and black showed no change in shade after 140 hours, and the other four colors showed only slight changes after long exposure. In the application of dry heat, all of the colors remained unchanged after 30 minutes exposure at 248° F.

Although delustering occurred in the acid Textone bleach and boiling water tests, as was expected, it was found that no color discharge or change of shade takes place in the fiber. Exposure to dry heat relusters the fiber after the boiling water treatment.

Many tests were run to determine the effect on the pre-colored fiber of normal dyestuffs. Results to date indicate that some specific dye procedures make it possible to obtain new colors, but the majority of dyestuffs tested affect the spun-dyed fiber very little or not at all. Tabulated data on this aspect now are available to those interested, Mr Feild stated.

CALENDAR OF COMING EVENTS

AMERICAN CHEMICAL SOCIETY
National Chemical Exposition—Oct 12-15, Chicago, Ill.

AMERICAN MANAGEMENT ASSOCIATION
23rd National Packaging Exposition—April 5-8, Convention Hall, Atlantic City, N J.

AMERICAN SOCIETY FOR QUALITY CONTROL
Meetings of the Carolinas Section—Feb 4-6, N C State College School of Textiles, Raleigh, N C; April 2, Clemson, S C.
Conference of the Carolinas, Georgia, Tennessee, Birmingham and Huntsvil'e Sections—Nov 5-7, Chattanooga, Tenn.

AMERICAN SOCIETY FOR TESTING MATERIALS
Committee D-13 (Textile Materials)—Mar 17-19, Hotel Statler, New York, N Y.
Annual Meeting—June 13-18, Sherman and Morrison Hotels, Chicago, Ill.

AMERICAN TEXTILE MACHINERY ASSOCIATION
Exhibit of American Textile Machinery, April 26-May 1, Atlantic City Exhibition Hall, Atlantic City, N J.

CANADIAN ASSOCIATION OF TEXTILE CHEMISTS AND COLOURISTS
Meetings of the Quebec Section—Jan 16, Feb 20, Mar 20, April 23-24 (Montreal, Que); June 19 (Annual Golf Tournament).

CHAMBRE SYNDICALE TRAMAGRAS
International Detergent Congress—Aug 30-Sept 5, The Sorbonne, Paris, France.

DELTA KAPPA PHI FRATERNITY
1954 National Convention—April 2-3, Raleigh, N C.

DRYSALTERS CLUB OF NEW ENGLAND
April 30 (Hotel Vendome, Boston); June 25 (Annual Outing, Andover Country Club).

THE FIBER SOCIETY
Spring Meeting—May 5-6, Monticello Hotel and Thomas Jefferson Inn, Charlottesville, Va.
Fall Meeting—Sept 13-14, McGill University, Montreal, Canada.

INTERNATIONAL CONGRESS OF MAN-MADE FIBERS
May 31-June 3, Paris, France

LOWELL TECHNOLOGICAL INSTITUTE ALUMNI ASSOCIATION
Annual Reunion—April 28, Haddon Hall, Atlantic City, N J.

NATIONAL COTTON COUNCIL OF AMERICA
Annual Meeting—Feb 1-2, Atlanta, Ga.
Cotton Research Clinic—Feb 17-19, The Carolina, Pinehurst, N C.

NATIONAL INSTITUTE OF DRYCLEANING
45th Annual Meeting—Feb 12-14, National Guard Armory, Washington, D C.

NEW YORK BOARD OF TRADE (DCAT)
28th Annual Dinner, March 4 (Waldorf-Astoria, New York, N Y).

PHI PSI FRATERNITY
51st Annual Convention, Feb 25-27 (The Carolina, Pinehurst, N C).

SOCIETY OF CHEMICAL INDUSTRY
Plastics and Polymers Group Meeting—March 24-26, Institution of Electrical Engineers, Savoy Place, London, England.

SOUTHERN MUNICIPAL AND INDUSTRIAL WASTE CONFERENCE
Third Annual Conference—March 18-19, N C State College, Raleigh, N C.

SOUTHERN TEXTILE EXPOSITION
October 4-9 (Textile Hall, Greenville, S C).

TEXTILE TECHNICAL FEDERATION OF CANADA
Exhibit—April, 1955, Show Mart, Montreal.

• 3rd Southern Municipal and Industrial Waste Conference Set for March

The Third Southern Municipal and Industrial Waste Conference will take place at North Carolina State College March 18 and 19. The Conference will feature a symposium on: 1) legal aspects of stream pollution; 2) research (municipal, industrial, and educational) activities and also separate technical sessions for various types of wastes. Dr Nelson L Nemerow of State College will serve as chairman.

Proceedings of the Second Conference are now available and may be purchased (price $1) from the Department of Sanitary Engineering, University of North Carolina, Chapel Hill, N C.

• Chemstrand Readies Commercial Production of Acrilan

William G Luttge, vice president in charge of sales for The Chemstrand Corporation, announced last month that Acrilan acrylic fiber, with additional characteristics of easier dyeability and improved mill processing, has undergone satisfactory mill evaluation and is now ready for commercial production.

"In line with advances made in manufacturing methods resulting from Chemstrand's research program, the price of Acrilan acrylic fiber, delivered at customer's plant, will be reduced to $1.40 per pound, effective immediately," Mr Luttge said.

Pointing out recent Acrilan developments, Mr Luttge stated, "A full range of colors is now possible for Acrilan using standard dyeing techniques with a wide variety of dyestuffs. Acrilan is the first acrylic fiber," he continued, "to union dye readily in the piece in blends with wool. As previously reported, there has been no change in the chemical composition of the fiber."

"Necessary minor mechanical plant changes for volume production of advanced Acrilan acrylic fiber are rapidly being completed. It is expected that manufacturing facilities at the Chemstrand Acrilan plant will be ready for normal output early in 1954, and customer requirements for the fiber will be met on schedule. Quantities of the advanced Acrilan acrylic fiber in 3 denier and 5 denier in both bright and semi-dull luster are available for immediate delivery," he said.

• Riverdale Purchases Monarch

Riverdale Dye Works, Inc, Yonkers, N Y, has purchased Monarch Piece Dye Works, Inc, Union City, N J, and since January 11 has been operating as Riverdale-Monarch Dye Works, Inc, P O Box 223, 523—23rd St, Union City, N J.

• Nopco Continues to Expand Canadian Operations

Nopco Chemical Co, which recently acquired manufacturing facilities in London, Ont, has now named Dillons Chemical Co of Montreal and Toronto as exclusive Canadian distributors for Nopco pharmaceutical products. Nopco, in making the announcement, stated that Dillons will maintain warehouses in both Montreal and Toronto where Nopco special pharmaceuticals and vitamins will be available.

The announcement comes a few weeks after Nopco's acquisition of manufacturing facilities in Canada through the purchase, in November, of the controlling interest in Yocum Faust, Ltd of London, Ont. Yocum Faust, for 37 years a manufacturer of industrial chemicals, has a well-established business in the tanning, textile, and paper industries. Nopco intends the subsidiary company to continue operations under the original name, Yocum Faust, Ltd.

Nopco reportedly plans an expansion of their new Canadian plant to accommodate enlarged production and sales, not only in the industries where Nopco is now established in the United States, but also in those industries toward which Nopco research and pilot work has been increasingly directed. Nopco Chemical Co, founded in 1907, today supplies over 300 chemical specialties.

• Union Carbide Changes in Canada

Since January 1, 1954, Union Carbide Canada Limited, a Subsidiary of Union Carbide and Carbon Corporation, has been operating the business of all of the following Companies:

Bakelite Company (Canada), Limited.
Canadian Railroad Service Company, Limited.
Carbide and Carbon Chemicals, Limited.
Dominion Oxygen Company, Limited.
Electro Metallurgical Company of Canada, Limited.
National Carbon Limited.

These Companies are Units of Union Carbide and Carbon Corporation. In the future their respective businesses will be carried on by Divisions of Union Carbide Canada Limited under the following Division names:

Bakelite Company.
Canadian Railroad Service Company.
Carbide Chemicals Sales Company.
Dominion Oxygen Company.
Electro Metallurgical Company.
National Carbon Company.

Ewart Greig, formerly vice-president of National Carbon Limited, is the president and director of Union Carbide Canada Limited. Other directors are: Salter A Hayden, H S Bunn, S B Kirk, W E Remmers, and K H Hannan.

• Recent Actions by ASTM Administrative Committee on Standards

The American Society for Testing Materials, through its Administrative Committee on Standards, have approved a number of important new standards and significant revisions. There follows a list of new and revised methods and specifications of interest to our readers.

NEW TENTATIVES

Methods of test for:

Tensile Strength of Wool Fiber Bundles (D 1294-53 T)

Recovery of Textile Fibers from Creasing, Using the Vertical Strip Apparatus (D 1295-53 T)

Analysis for Carbureted Water Gas by the Mass Spectrometer (D 1302-53 T)

Maturity of Cotton Fibers (Random Sample-Sodium Hydroxide Swelling Method) (D 1443-53 T)

Cross-Sectional Characteristics of Cotton Fibers (D 1444-53 T)

Strength of Cotton Fibers (Flat Bundle Method) (D 1445-53 T)

Number of Neps in Cotton Fibers (D 1446-53 T)

Specifications for:

Rosin Flux Cored Solder (B 284-53 T)

85 Per Cent Magnesia Thermal Block Insulation (C 319-53 T)

85 Per Cent Magnesia Thermal Pipe Insulation (C 320-53 T)

REVISION OF TENTATIVES

Methods of:

Testing Cotton Fibers (D 414-52 T)

Test for Resistance of Textile Materials to Microorganisms (D 684-45 T)

Testing and Tolerances for Rayon Tire Cord (D 885-53 T)

• Heyden Opens New Sales Office in Cincinnati

Heyden Chemical Corporation has opened a new sales office in the Paramount Building, 920 McMillan Street, Cincinnati, O.

T H Risch, previously assigned to Heyden's Chicago branch office, has been appointed manager of the Cincinnati branch. He has been associated with Heyden since 1947.

• Textile Division, ASQC, to Meet in Raleigh

A full program of technical papers covering various phases of textile manufacturing, elementary and advanced statistical quality control, and operations research will highlight the annual meeting of the Textile Division, American Society for Quality Control, to be held at the School of Textiles, North Carolina State College, February 4-6.

Supplementing the technical program will be mill tours, exhibits, a banquet and entertainment.

• Polymer Industries Projects New Plant

A modern new plant designed for expanded production and overall efficiency will be opened in Stamford, Conn, shortly by Polymer Industries, Astoria, L I, manufacturers of industrial adhesives and textile chemicals and finishes.

Located on a four-acre site in Springdale, a suburban section of Stamford, adjacent to a New York, New Haven and Hartford Railroad siding, the new plant will consolidate the firm's Astoria and Brooklyn operations and reportedly will enable Polymer Industries to immediately increase present production 50%.

In addition to its new plant the company will continue to produce a full line of adhesives and textile chemicals and finishes at the Polymer Southern plant in Greenville, S C.

• Millmaster Representing Hydrocarbon Chemicals

Millmaster Chemical Corporation, 11 West 42nd Street, New York, is now representing Hydrocarbon Chemicals, Inc, Newark, N J, as exclusive selling agent for sulfonic acid, sulfonates and related products.

The facilities of Hydrocarbon Chemicals are specially designed for large and small tonnage production of a diversified line of these products, which include toluenesulfonic acid, benzenesulfonic acid, xylenesulfonic acid and their various salts.

• Arthur D Little to Open Western Office

Arthur D Little, Inc, will open a western regional office in San Francisco early this year, according to an announcement by Earl P Stevenson, president of the Company. Christian J Matthew, a long-term employee of the Company in Cambridge, will be in charge with Richard Newhall of San Francisco as an associate. In addition to work on assignments for western clients, they will provide liaison with the company's main research organization in Cambridge, Mass.

• Price Reductions in "Monastral" Pigments

Price reductions averaging about 10 per cent on most of its line of "Monastral" green and blue pigments have been announced by the Du Pont Company, the first on these phthalocyanine type pigments since the war.

Representative of the reductions are the Monastral green toner, reduced from $4.40 to $3.95 a pound, and the Monastral blue toner, reduced from $3.85 to $3.45 a pound.

• Textile Houses Sampling New Celaperm Colors

Increasing momentum is being given the expansion of consumption of colored yarns with the sampling of new Celaperm colors by leading textile houses. The new fast colors were recently introduced by Celanese Corporation of America for its Celaperm solution-dyed yarns.

J Guyton Boston, general sales manager of the Textile Division of the Company, points out that this contribution was made possible by the employment of pigments not previously used in the acetate yarn industry. The research leading up to the development was carried on at the Summit, N J, laboratories of the Company.

A total of nineteen different shades is now represented in the Celaperm line, comprising eleven new colors and eight shades which were introduced earlier.

• APPA Official Addresses National Starch Products Staff Meeting

E W Tinker, executive secretary, American Paper and Pulp Association, was the guest speaker at the recent National Starch Products staff meeting, held in New York.

Frank Greenwall, president of National Starch Products Inc, opened the meeting and reviewed the company's progress and growth during 1953. He also pointed out to the group, the company's proposed plans for the expansion of the Indianapolis plant, and for the further increasing of the company's capacity for producing vinyl acetate polymers and copolymers.

• GAF Price Reduction in 2 Glycols

General Aniline & Film Corporation, New York, has announced a new reduction in the price of 1,4-butanediol—40 cents a pound in carload lots. Although still in the development stage, this glycol is available in semi-commercial quantities.

A reduction has also been made in the price of 2-butyne-1,4-diol, which is now 13 cents a pound in carload lots for the 35% aqueous solution.

These two glycols are both available from General Aniline's development program on high-pressure acetylene derivatives. Further price reductions are anticipated when they achieve commercial production.

Price lists and technical data on these products are available from GAF's Commercial Development Department, 435 Hudson Street, New York City.

NEW PRODUCTS AND DEVELOPMENTS

• Tensionless Vapojet Dryer

The Hunter Vapojet Dryer, announced to the trade early last year, is now available in tensionless version.

In this version, drying is accomplished by the Vapojet principle, which impinges jets of super-heated steam at high velocity on both sides of the fabric as it passes through the machine at speeds of fifty yards per minute. It is claimed that controlled drying of this type, at steam vaporization temperature, is the most efficient method yet developed. Undesirable over-drying is eliminated.

The Tensionless Vapojet is said to afford complete relaxation warp-wise and filling-wise in cases where framing is not necessary. The manufacturer claims that the tensionless unit can be used for shrinking as well as drying any known fabric from terry toweling and denim to plisse. Fabric reportedly may be introduced into the dryer at up to one hundred per cent over-feed.

• Jordan Offers Two New Resinous Products

The W H & F Jordan, Jr, Mfg Co, Philadelphia, is offering for sale two new resinous products for the latex and paint industries—sodium and potassium polyacrylate.

Descriptive brochure, samples and price quotations are available on request.

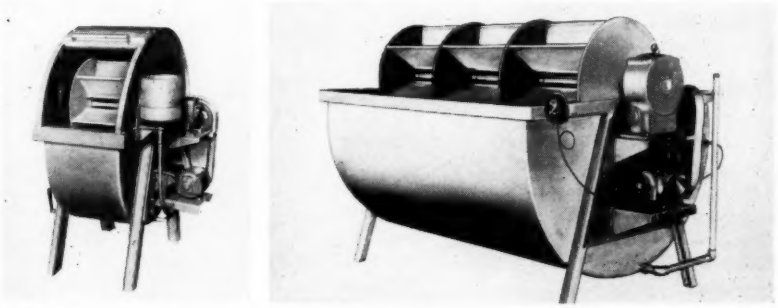
• Electrostatic Neutralizer Bar

The new "Magic Wand" Electrostatic Neutralizer made by Herman H Sticht Co, Inc, 27 Park Pl, New York, is finding increased application among textile manufacturers, for improving processing and eliminating electrostatic fire and explosion hazards.

The "Magic Wand", a simple self-energizing induction neutralizer, requires no external source of power.

The manufacturer claims the following advantages over other neutralizers: low cost, small space requirements, no applied high-voltage requirements, no health hazards, long service life, no maintenance cost, lowest electrostatic capacitance, no sharp points, static efficiently neutralized regardless of voltage of electrified stock or processing speed.

The company's illustrated technical bulletin #125 describes the principles of operation and the characteristic properties of typical electrostatic neutralizers now on the market.



(Left): Klauder Weldon Giles' new stainless steel paddle wheel small capacity dyeing machine. (Right): K-W-G's paddle wheel machine now available up to 500-lb capacities.

• K-W-G Announces Small Capacity Dyeing Machine

Klauder Weldon Giles Machine Co, Philadelphia, has introduced a stainless steel paddle wheel machine for small lot dyeing. The new small capacity machine is especially useful for laboratory experimental and control work, special lot dye jobs, and small production runs as would be found in thread dyeing and in small lot custom dyehouses.

As in their large paddle wheel machine, extremely rigid construction is provided by individual paddles in the paddle wheel set into milled grooves and welded; splash covers protect motor and drive mechanism; and a heavy false bottom prevents danger of damage to goods or machine in the event of overloading.

The large paddle wheel machine is now available up to 500 pound capacities. Further improvements on this unit include an extra strength three-section paddle wheel, which doubles capacity for the dyeing of sweaters, hosiery, tapes and webbing, etc.

Full information on both is available from the company at Adams Avenue and Leiper St, Philadelphia 24, Pa.

• 26% Active Slurry Form of Igepon

The Antara Chemicals Division of General Dyestuff Corporation last month announced it is producing a 26 per cent active slurry form of Igepon made from tallow, costing 9½ cents per pound. This is believed to be the first tallow-based synthetic detergent ever offered in commercial quantities.

• Armour Offers Unsaturated Secondary Fatty Amines for Industry Tests

Two new unsaturated secondary amines, Armeen 2S and Armeen 2T, produced from tallow and soya, are now available to the industry from the Armour Chemical Division, Chicago. Armour points out that, because of the unsaturation in both compounds, they are more easily liquefied than the corresponding saturated secondary amine and will show better solubility in organic solvents.

The manufacturer cites the following analysis:

	Armeen 2T	*Armeen 2S*
Secondary amine content	85%	85%
Primary amine content	5%	5%
Neutralization equivalent	520-540	520-540
Iodine value	35 min	60 min
Temperature to liquefy	50° to 55°C	45° to 50°C
Color	light tan	light tan

Both products are available in single drum quantities for experimental testing. Present prices are f o b, Chicago: 43c per lb for Armeen 2S and 40c per lb for Armeen 2T.

• Barnstead Announces New Demineralizer Line

The Barnstead Still & Sterilizer Co, Boston, has announced a new line of mixed-bed water demineralizers featuring an improved system for regeneration of the purifying resins after they have become exhausted. Capacities are said to range from 50 to 2,500 gallons/hr.

The effective ion removal by the Barnstead units is said to result in an effluent water of very high electrical resistance, often up to 20,000,000 ohms per cc.

Literature and engineering recommendations may be obtained from the company at 148 Lanesville Terrace, Forest Hills, Boston 31, Mass.

• Refined Products Develops New Organic Sequestrants

A new development in organic sequestrants was recently announced by Ralph Zoccolillo, president of Refined Products Corporation, Lyndhurst, N J. After three years of intensive research, and more than a year of field testing in major textile, soap and chemical plants, these new compounds, known as the "Perma Kleers" are now available to industry.

The Perma Kleers are stable salts of polyamino carboxylic acids said to possess excellent solubility, superior chelation of ferric ion, and great efficiency for sequestering calcium and divalent metals.

The Perma Kleers reportedly react with metal ions to form water soluble chelates, deactivating them, without actually removing them from solution. The solubility of the Perma Kleer complexes, on the whole, is claimed to be much greater than similar chelates of EDTA.

The metallo-Perma Kleer complexes are not precipitated by such agents as soaps, oxalates, phosphates, etc, it is stated. The tendency to form metallic complexes is said to be so great that most insoluble metal compounds are chelated. Of the common anions, only sulfide resists this force.

It is claimed that the Perma Kleers are superior to EDTA in that they are effective over a far broader pH range. Calcium is reported to be efficiently chelated down to pH 7, while ferric ion is sequestered well beyond pH 11 with only moderate loss in efficiency. The Perma Kleers form soluble complexes with ferric ion in both alkaline and acid media, it is stated, particularly in the presence of soap and synthetic detergents.

The manufacturer advises that, where Perma Kleers are added to a solution containing various metal ions, chelation will be preferential. One metal will be completely sequestered before another metal. The metal sequestered first will have the highest stability constant. Chelation will continue in order of decreasing constants until either the metal ions or the Perma Kleers are exhausted. The only exemption is ferric ion. Chelation takes place independently, and is not usually affected by the presence of divalent metal compounds. The major factor in chelation of ferric ion is pH. Maximum sequestration reaches its peak somewhere around the neutral point, dropping slowly as the pH is raised. Even when the complex is completely saturated with ferric ion, it still retains full chelating power for calcium, magnesium, and divalent metals, it is stated.

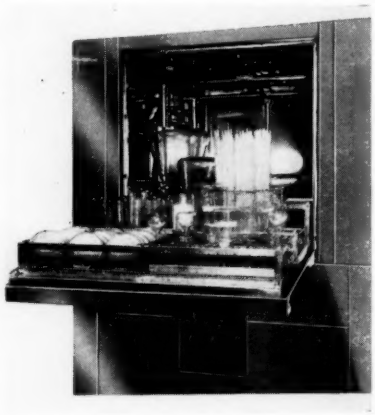
When the Perma Kleers are added to soap and synthetic detergents, it is claimed that an increase in foam and detergency is observed. This action, which is similar to that observed with polyphosphates, is apparent in both hard and soft water.

Complete details are contained in a free booklet available from the Refined Products Corporation.

• Laboratory Glassware Washers Said to Readily Penetrate Pipettes

A series of patented laboratory glassware washers is being introduced by Heinicke Instruments, 2035 Harding St, Hollywood, Fla, specifically designed for processing glassware used in control and research. Available in three models, the series encompasses the loads of the smallest to the largest laboratories.

All models are powered by high-pressure-jet systems, which are claimed to be of such efficiency that even capillary pipettes are readily penetrated. Culture media, organic and inorganic chemical deposits, oils, waxes, and the often tenaciously clinging soil encountered in industrial research and control laboratories are said to be easily removed.



Heinicke Lab Glassware Washer

The glassware is washed, rinsed, and optionally distilled-water rinsed. It is reported that the simultaneous above and below pressure automatically holds the glassware in place in simple baskets.

Size limits: Capillary pipettes to 10 liter flasks & bottles.

• Additions to Geigy Line

Geigy Dyestuffs, a Division of Geigy Chemical Corp, New York, has announced the addition of the following colors to its line: Solophenyl Brilliant Green 5GL, Polar Brilliant Violet BL, Setacyl Yellow 3RN, Diphenyl Fast Orange GRW, and Irgalan Brown Violet DL.

The manufacturer has furnished the following descriptive material:

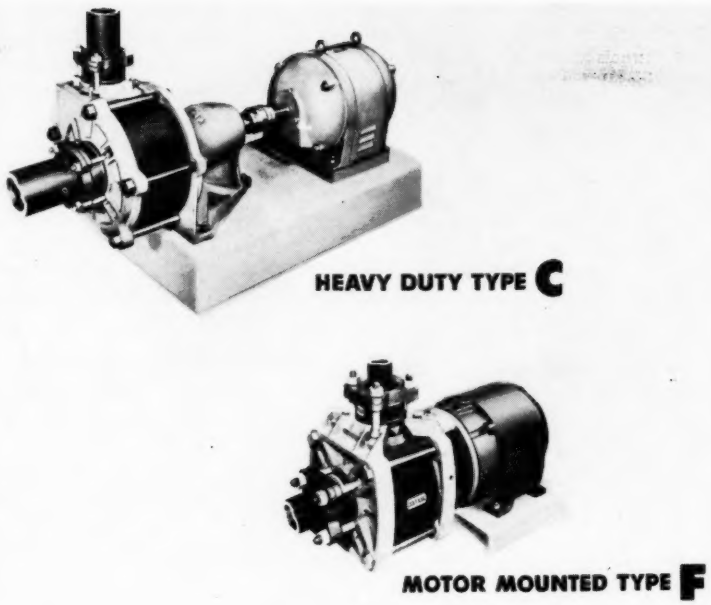
Solophenyl Brilliant Green 5GL——— "a bright yellowish shade of green with very good light fastness. It is well adapted for aftertreatment with copper and acetic, Gycofix 67, and Gycofix 67 plus TBL finish. When so aftertreated the shade goes appreciably yellower and a little duller, but the wash fastness is materially increased".

Polar Brilliant Violet BL———"produces exceptionally bright shades of violet with good all around fastness properties, and outstanding light fastness. It draws well from a neutral bath on both nylon and wool and will exhaust almost completely onto either fiber with small amounts of acetic acid. In fact, the drawing properties of this new dyestuff make it well suited for use in small amounts as a shading color for Geigy's Irgalan and Irganol dyestuffs".

Setacyl Yellow 3RN ——— "produces clear, golden yellow shades of excellent light fastness and good wash fastness on acetate rayon and nylon. Unlike Setacyl Yellows GLF and 4RL, this new product has very good strength and shade build-up on nylon. Other features of interest are: similar shade on nylon as acetate, low-temperature drawing, excellent dispersibility, suitable for either box or jig dyeing, excellent light fastness on Dacron as well as acetate and nylon. It is recommended for general use as a versatile reddish yellow for acetate on nylon staple fiber, yarns or piece goods requiring high fastness to light. It also produces excellent results with good light fastness on Dacron." (Bulletin 56-G available.)

Diphenyl Fast Orange GRW———"a companion color to Diphenyl Red RW that dyes both cotton and rayon bright shades of orange with unusual wet fastness for a direct dyestuff. Outstanding features include good fastness to washing, good resistance to water bleeding and perspiration, excellent neutral and alkaline discharge properties, good exhaustion with minimum amounts of salt, and good solubility. It is particularly suitable for the economical dyeing of dischargeable ground shades on rayon dress fabrics, and can be used in many instances as a replacement for diazotized and developed oranges." (Bulletin 57-G available.)

Irgalan Brown Violet DL———"possesses almost the same working fastness properties as Geigy's other Irgalans and is, therefore, recommended for the dyeing of wool, nylon or pure silk in neutral or weak acid dyebaths. The shade of this dyestuff goes decidedly redder in artificial light, thus permitting it to be used in combination with other Irgalan colors when it is necessary to match mode shades of tans, taupes, greys, etc, which also tend to go redder in artificial light. Bulletin 55-G (available on request) displays two shades of brown".



Two New Models—"Karbate" Impervious Graphite Centrifugal Pumps

• New "Karbate" Impervious Graphite Centrifugal Pumps

A new series of "Karbate" Impervious Graphite centrifugal pump sizes and types has been announced by National Carbon Company, a Division of Union Carbide and Carbon Corporation, New York.

The new Type C and Type F pumps, through an array of design improvements on the original Model A pump, offer the industry two distinct new pumps for application under severe corrosive conditions and wherever pumping conditions are corrosive to ordinary iron and steel and such common applications as the handling of salt brines and sea water. They are said to be easier to install, easier to operate, easier to maintain, and to cover a greatly extended range of capacities.

The "Karbate" Type C centrifugal pump, a heavy duty model, has a high degree of parts standardization among pump sizes. There are three basic sizes, having discharge openings of 2", 3" and 4", with either 10" or 8" impellers. All major pump parts, except the volute case, suction cover flange and impeller assembly are interchangeable, model for model.

The "Karbate" Type F centrifugal pump, a motor-mounted design, is for corrosive pumping applications which require the close-coupled pump with the operating and maintenance features of a frame-mounted pump. Pump and motor alignment is automatic. The carbon-to-carbon mechanical seal is self-cooling, self-lubricating and can be adjusted while the pump is running.

The new pump types offer capacities from 5 to 1500 gpm at discharge pressures up to 1,000 psi; mechanical seal with enclosed coolant; rugged Type SN armored connections; maximum interchangeability of parts; and pump efficiencies to 60 per cent.

Both are described and illustrated in a new *Catalog Section S-7250*, a copy of which may be obtained by writing National Carbon Company, 30 East 42nd Street, New York 17, New York.

• Powerful New Chelating Agent for Trivalent Iron

"Versen-OL", Bersworth Chemical Company's newest "Versene", is expected to have wide application in wet processing wherever trace iron creates a problem and causes trouble through its contaminating influence. Known chemically as the trisodium salt of N-hydroxyethylethylene diamine triacetic acid, the new compound is said to be extremely soluble in water and highly stable throughout the pH range.

Versen-OL is designed as an aid in controlling trivalent iron over a wide pH range. It forms strong 1:1 ferric chelates and is said to prevent hydrolytic decomposition even in strongly alkaline solutions. Any Versen-OL that remains after chelating the iron present reportedly inactivates other heavy metal or alkaline earth ions until exhausted.

Versen-OL is manufactured by Bersworth in Framingham, Mass. Patents on the new product are pending and it is now available in commercial quantities. Research samples may be had on request by writing direct to the manufacturer.

• Scourclean X; Rosperse

Two new products recently brought out by Richmond Oil, Soap & Chemical Co, Inc, Philadelphia, are attracting considerable interest in the trade.

Scourclean X, a combination of selected synthetics in combination with cresols and other solvents is reported to show unusual oil and grease-removing characteristics, making it particularly adaptable to most textile-scouring operations. It is also said to possess effective soil-removal and soil-suspending qualities, good wetting characteristics, and excellent stability to hard water, acids and alkalies used in textile processing. Richmond recommends its use in the fulling and scouring of woolens and worsteds (a small amount in the rinse after fulling to lift the residual soap and give cleaner fabrics) and in the dyebath for rayons, acetates and cottons for scouring, dye dispersion and leveling.

Rosperse, a new economical nonionic material, is finding application as a dyebath assistant in dyeing ladies' full-fashioned and seamless hosiery. The retarding action of this material is said to produce a better union between the monofilament and multifilament nylon yarns. It is said to possess excellent leveling and dye-dispersing characteristics.

• Ahcovat Brown 4-R Double Paste

Ahcovat Brown 4-R Double Paste, a homogeneous anthraquinone dyestuff recently added to Arnold, Hoffman's vat line, is said to possess several unique qualities, among which is its outstanding chlorine fastness in rich, red-brown shades.

It is further claimed that the product holds its hue when shade depth is increased or decreased and it is said to fade "on tone". Other features pointed out by the manufacturer are the product's constant shade under artificial light, excellent money value, and excellent light and wash fastness.

Ahcovat Brown 4-R Double Paste is recommended by Arnold, Hoffman for use as a self-shade for production of smart red-browns and as a shading color, or as a basis for a combination of shades. It is reported that rust, hennas and brick shades are produced economically. Other suggested uses of this printing brown are as a self-shade for red-browns, which are capable of being built up to rich, dark browns on cottons, mercerized cottons, linen and rayon fabrics, and as a basis for the production of fawn, olive and brown shades.

Information and working samples may be obtained from Arnold, Hoffman & Co, Inc, Providence, R I.

• Aquabond Pigment Colors for Printing Textiles by Oil-in-Water Emulsion System

For fast-color printing, Interchemical Corporation's Textile Colors Division, Hawthorne, N J, has introduced a new series of resin-bonded pigment colors, known as Aquabond Pigment Colors, for use on cotton, rayon, nylon, acetate, and other fabrics. Although Aquabond Pigment Colors can be used in the form of aqueous dispersions, at present they are generally applied in the form of oil-in-water emulsions. They supplement Interchemical's Aridye® 400 Series Pigment Colors, which are applied in the form of pigmented water-in-oil emulsions.

Like Aridye Pigment Colors, the new Aquabond Pigment Colors provide a wide range of shades reportedly possessing excellent all-round fastness properties. They are said to be suitable for machine printing on conventional types of equipment.

Specific advantages of the Aquabond Pigment Colors are said to include exceptionally sharp marks and smooth blotches. These new colors are reported to have excellent linting qualities. Because they are water dispersible, Aquabond Pigment Colors facilitate cleaning of print rollers, furnishers, backgreys, blankets, and other equipment, it is claimed.

Interchemical advises that Aquabond Pigment Colors may be employed alone or alongside Aridye Pigment Colors, Arigen® Dyes (Interchemical's stabilized azoic dyes), and other classes of soluble dyes to provide a wide variety of color combinations. When Aquabond Pigment Colors are used alone or alongside Aridye Pigment Colors the fabric, after being printed and dried, is heat-cured to polymerize the synthetic resins used as bonding agents for the pigments. When used in conjunction with Arigen Dyes or other soluble dyes, the fabric, after printing, is subjected to the same type of aftertreatment normally employed for those dyes.

Aquabond Pigment Colors are prepared for application by the oil-in-water emulsion system by mixing the required amounts of concentrated colors into an Aquabond Cut Clear to provide the desired depth of shade. Mixing is carried out with the aid of a high-speed mixer. Aquabond Clears are offered in concentrated form and are cut as they are needed in the printing plant.

Printing is carried out in the usual manner, no change in the usual set-up of machines being necessary. The colors as printed are said to be final in shade, permitting the printer to detect and correct any defects immediately and to keep the pattern in fit throughout a run.

Prints produced with Aquabond Pigment Colors are reportedly characterized by their brilliancy of shade and high degree of fastness to washing, drycleaning, and crocking. It is stated that, because the prints do not bleed when washed, discoloration of white grounds is avoided. Selected colors in the series are said to have exceptional fastness to light, making them particularly desirable for printing drapery fabrics. Aquabond Pigment Colors also provide excellent resistance to caustic cut out in plisse work, it is claimed.

• New National Aniline Products

National Aniline Division, Allied Chemical & Dye Corporation, New York, has submitted the following descriptive material relative to six new products announced during December and January*:

National Carbanthrene Yellow 3GFN Double Paste———"a new anthraquinone vat dye producing, on cotton and viscose rayon, clear shades of golden yellow. It reduces readily to a grey leuco at 140° F and dyes levelly and uniformly in a moderately alkaline bath at 120° F. This dye possesses superior solubility and dispersability and is highly recommended for pressure dyeing and pad jig application. It has excellent fastness to all wet processing including boiling soap, chlorine and peroxide bleaching, mercerizing and cross dyeing. Materials colored with this product exhibit good fastness to light and exceptional resistance to the effects of commercial laundering. This dye is also valuable as a component in mixtures producing a variety of rich browns, tans, taupe and beige shades as well as a range of pleasing yellow tones".

National Solantine Grey GVF ——— "the newest addition to National's line of nondusting exceptionally fast-to-light direct dyes. When dyed in the usual manner for direct dyes, it produces, on cotton and rayon, pleasing shades of blue grey. Dyed on viscose rayon, it exhibits excellent fastness to light, perspiration and crocking. Aftertreatment with urea-formaldehyde resin for crease resistance, in conjunction with National Naccufix, results in a marked improvement in wash fastness and no loss in light fastness. Materials thus processed are suitable for use in women's and children's dress goods, suitings and beach and sports wear".

National Violet BN Salt———this new addition to National's line of diazo color salts . . . "is applicable to cotton and viscose rayon by all the printing and dyeing processes generally employed for dyes of this type. It produces a yellow on National's Naphthol AS-G bottom and varying shades of violet and bordeaux with the other National naphthols. Most of the couplings of this product with the various National naphthols possess very good to excellent fastness to light, washing, soda boil, acids, alkalies and peroxide bleaching. National Violet BN Salt is recommended for the printing and dyeing of cotton and rayon materials for sport and play clothes, decorator and other fabrics that are to be exposed to sunlight and vigorous laundering".

National Red AL Salt———this . . . "stable diazonium salt derived from anthraquinone is another addition to National's line of fast color salts. It is used to develop the various National naphthols varying shades of red, scarlet, yellow and brown. It can be applied to cotton and rayon in the form of raw stock, yarn or piece goods, in open tubs, pressure dyeing machinery, on the jig or reel, or by the continuous padding method. This product's salient characteristic is its outstanding light fastness, being rated very good to excellent for most combinations. Materials colored with National Red AL Salt will withstand rigorous laundering and can be resin finished for crease resistance with practically no change in shade or light fastness".

National Chromolan Green BL——— the latest addition to National's line of nondusting, premetallized acid dyes. "It produces, on wool, bluish green shades of moderate brightness. It is especially recommended for dyeing un-neutralized carbonized pieces, and other woolen pieces in a highly acidic condition including materials that have been acid chlorinated. It possesses good light fastness and very good fastness to steaming, carbonizing, acids, acid perspiration, cold and sea water spotting and rubbing. This product will be found suitable for coloring carpet yarn, knitting yarns for hosiery, sweaters and bathing suits, and also for dyeing ladies' dress goods".

National Naccogene Yellow GS Powder ———a new addition to National's line of stabilized azoic dyes. "It produces, when printed on cotton and rayon, pure greenish shades of yellow. It has very good stability and is compatible with starch-tragacanth printing pastes. This product possesses good light fastness and very good fastness to rubbing, hot pressing, boiling soap or soda, peroxide bleaching, washing, perspiration and sea water. It can also be printed along with the leuco vat ester dyes, such as the National Solvats, for the production of launderable multicolor prints".

* Quoted material is from manufacturer's release.

• Nopco Answer to Soil Problems

The answer to critical soil problems in synthetic fabrics is claimed by Nopco Chemical Company, Harrison, N J, for its new line of processing oils. These new oils, Nopco 1056-A, 1056-AR, and 1125-P, all feature a built-in detergent which is said to lift dirt from the fibers quickly and easily. Each oil is compounded to give balanced fiber-to-metal lubrication, adequate antistatic control, and quick spreading action necessary for high-speed equipment.

Nopco 1056-A is said to produce the static-free, even-tension warps which are especially desirable for nylon or acetate tricot. It is recommended by Nopco as a topping oil for slasher-sized yarns, as an antistatic quilling oil for cops, and as a coning oil for even-density packages. Nopco 1056-AR is designed for fine denier yarns which demand low tension control. Nopco 1125-P is used for yarns which have become dirty in processing, such as premium lace-making where fibers become impregnated with graphite. It is reported to be completely self-scouring and requires no additional soap.

• Initiator RES

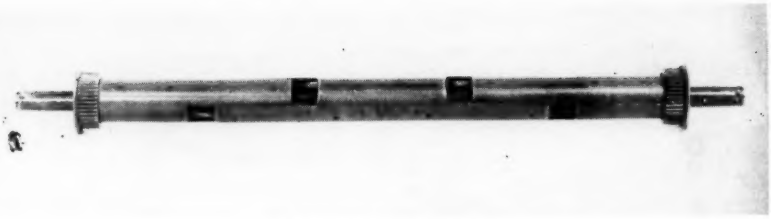
Officials of the Aquex Development & Sales Corp, Whippany, N J, report that their new catalyst, Initiator RES, used with Aquex textile processes to produce striking finishing results on 50% viscose-acetate blends plus 100% viscose fabrics, has proved "dramatically successful in extensive production runs".

The new discovery is said to provide complete washability as well as such additional properties as crease resistance, water repellency, color and light fastness for viscose blend, viscose and Bemberg fabrics. It is claimed that these properties are unimpaired for the life of the fabric.

• G-602 Combining Adhesive

New applications for vinyl coated fabrics and paper are suggested with the development of G-602, a new combining adhesive which allows very thin films of vinyl to be laminated to cloth and paper. According to the Pioneer Latex & Chemical Co, producers of G-602, the adhesive joins vinyl and cloth or paper when the two materials are brought into contact with very low pressure. The company points out that, since excessive pressure is no longer necessary, the stretch marks, sags and other unevenness are eliminated. Laminating is done at low temperatures and a minimum of heat is required for drying.

Information on G-602 can be had by writing Pioneer Latex & Chemical Co, Lincoln Boulevard, Middlesex, N J.



Sliding-action Dry-Box Pole

• Servo-Tek Introduces New Type Dry-Box Pole

The Servo-Tek Products Co, Inc of Hawthorne, N J, after seven years of research, experimenting, developing and improving, has made available to the wet-processing industry a new type of sliding-action dry-box pole, which is said to be lighter and stronger than the conventional hardwood pole. It is claimed that it will last 2 to 4 times as long.

Unlike the conventional hardwood dry-box pole now in general use, the Servo-Dry-Pole is one-piece in construction and comes completely assembled. It comprises a special ⅛" synthetic outer surface backed by a steel tang and is said to be unaffected by heat or climatic conditions. The manufacturer points out that this finish, tested at sustained operating temperatures of 450° F, did not bake out, char, crack or powder. The steel tang which lines the 3 cylinder sections is designed to provide smoother-sliding metal-to-metal contact, minimizing friction and jamming. By making the center cylinder section of uniform length, and varying the length of the end sections, Servo-Tek is able to provide these new poles in any desired length. Another feature is the countersunk brass screws which replace the conventional method of wire binding.

The price is approximately the same as for a conventional hardwood pole.

• Aerotex Resin UM Special

The Textile Resin Department of American Cyanamid Company has announced the development of Aerotex Resin UM Special, a new resin which is said to have greater solubility and pad bath stability in addition to less caking tendency in containers at high temperatures. It is designed to produce a durable wrinkle resistance and to give shrinkage control on cellulosic fabrics. Cyanamid points out that it is especially well adapted for use in glazed chintz and embossing formulas where maximum durability is desired. Mills making such application will need a license under the Bancroft patents.

* * * * *

Since January 1, Cyanamid has been marketing Aero Maleic Anhydride, a highly reactive intermediate, in briquette form.

• New National Starch Developments

National Starch Products Inc, New York, has announced the development by the Research Department of a new series of chemically treated starches having unusual emulsifying properties. In addition, the company's Resin Division has announced the commercial availability of a new water-resistant polyvinyl acetate emulsion known as Resyn 10K-25.

Napon, the latest in a group of starch products developed by National, are now available in experimental quantities. They are said to contain substituent groupings which possess hydrophobic and hydrophilic characteristics. As a result they are of interest where a combination of thickening and emulsifying ability is desired. Napons are said to be practically odorless and tasteless, white in color, and available in high, medium and low viscosities. Their use in water-repellent treatments should be of interest to the textile manufacturer.

Field experience in formulated water-resistant adhesives, wash-resistant textile finishes and wet-scrub-resistance tests on coatings lead National to declare that Resyn 10K-25 possesses greater water resistance than any standard emulsion of this type.

• Halltex KRS; Vinrez #101

Two recently developed products, Halltex KRS and Vinrez #101, are now being marketed commercially by Stein, Hall & Company, Inc, New York.

Halltex KRS is a sodium alginate printing thickener that is readily soluble in cold water and highly rinsible after processing. Its clear film and uniform viscosity offer many uses in the printing of Rapidogen and Indigosol dyestuffs.

Vinrez #101 is a polyvinyl acetate emulsion especially recommended by the manufacturer for textile printing. Its transparent, water-resistant films adds attraction to its use as a weighting or bodying agent on colored goods. Its running properties are said to be ideal and it is claimed that it does not cause pick-offs on mangle bowls or buildup on hot drying cans.

NAMES IN THE NEWS

T A Haschke

THEODORE A HASCHKE has been appointed director of sales of the newly-organized Industrial Chemical Division of Stauffer Chemical Company, its subsidiaries and associated companies.

Mr Haschke started in the chemical business in 1919 and joined Stauffer seven years later. He was named sales manager of the Eastern Division in 1942, a post he held until this latest promotion.

GENERAL Chemical Division, Allied Chemical & Dye Corporation, has announced the appointments of three new vice presidents to head major segments of its operations.

VINCENT W SUELLAU has been named vice president in charge of sales. A member of the Division's sales organization for 33 years, Mr Suellau has been director of sales since 1950.

I H FOOSHEE, new vice president in charge of development, joined General Chemical in 1947. His most recent post was that of director of development.

HARRY S BOWEN, named president and auditor, has been with the Division since 1923. He was made assistant general manager in 1938.

JOSEPH W MACNEIL, formerly vice president of United States Dyestuff Corporation, has joined Althouse Chemical Co, Reading, Pa, as New England district sales representative.

J H RUSKIN has been elected executive vice president of Chemical Construction Corporation, G I SEYBOLD and MARTIN de SIMO, vice presidents, and THOMAS P FORBATH, assistant to the president.

Mr Ruskin joined the parent firm, American Cyamamid Company, as a member of the Legal Department in 1947 and later served as assistant secretary and assistant general manager of the Petrochemicals Division.

P F Tevis

PAUL F TEVIS has assumed his duties as general sales manager of the Soap Division of Armour and Company, a newly created position. He will direct the sales of the household soap department. He will also direct the sales of the industrial and contract soap departments and glycerine department.

Mr Tevis was formerly executive vice president, director and sales manager of the College Inn Food Products Company, Chicago.

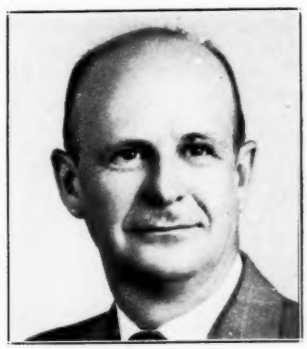
F H Gleason

EMKAY Chemical Co, Elizabeth, N J, has appointed FRANK H GLEASON to its technical sales staff in the textile and paper specialty field.

In recent years, Mr Gleason has been superintendent of weaving with E W Twitchell Corp, plant manager with Cotswald Fibre Co, and salesman with Colloids Inc.

THE election of CLARENCE E KILLEBREW as vice-president has been announced by Clark Equipment Company of Michigan.

Mr Killebrew formerly was manager for marketing and sales in Clark's Construction Machinery Division. He will have similar responsibility in his new position, and will be in charge of sales and marketing of all products sold under the "Michigan" tradename.



A F Beane

A F BEANE has joined the Fine Chemicals Division of Pittsburgh Coke & Chemical Company as a dyestuff sales representative. His office will be in Room 202, 1524 South Boulevard, Charlotte, North Carolina.

Immediately before joining Pittsburgh Coke & Chemical, Mr Beane served as a dyestuff sales representative in the Carolinas.

A NEW treasurer and two new directors of Hercules Powder Company, Wilmington, Del, were announced by the company following a recent meeting of the board of directors.

JOHN E GOODMAN was elected treasurer succeeding FRANCIS J KENNERLEY, whose retirement at the year-end had previously been announced.

JOHN M MARTIN, general manager of the company's Explosives Department, and JOHN R L JOHNSON, JR, director of the Hercules Legal Department, were elected directors of the company at the same meeting. They fill the vacancies created by the retirements of Mr Kennerley and WILLIAM R ELLIS, vice president.

R H DUNHAM, former president and chairman of the board of the company, also retired from active service at the year-end, but will continue as a member of the board of directors.

Additional news from Hercules concerns the appointment of J O SMALL as an assistant director of sales in the Synthetics Department. His new duties will be primarily sales administration and promotion. F G OSWALD continues as assistant director of sales with responsibilities primarily related to technical aspects of sales.

Another new assignment in Wilmington is that of G E OSBURN, who has been named sales manager in charge of products for textiles, adhesives, printing inks, plastics and the petroleum industry.

I Dennery

NOPCO Chemical Co, Harrison, N J, has announced the appointment of IRENE DENNERY as advertising and sales promotion manager. Her duties call for the supervision of advertising and sales promotion for the following divisions of the company: Industrial Division, Vitex Laboratories, Agricultural Division, and Pharmaceutical Division.

Miss Lennery returns to Nopco after having served several years ago as assistant to the vice president. She recently served the Ajax Electric Company, Philadelphia, as advertising manager.

W F CORNELL, Divisional President, Interchemical Corporation, Printing Ink Division, has accepted the chairmanship of the Printing Inks Division of The Legal Aid Society's annual fund raising drive.

The Society is seeking a minimum of $375,000 with which to carry on its work of advising and representing those who cannot afford the services of an attorney in private practice.

THOMAS H TRIMBLE, formerly of the sales department of Hooker Electrochemical Company, has been appointed to assist R W HOOKER, vice president in the public relations department. Mr Trimble has been with the firm since 1935.

* * * *

The following chemists have been added to Hooker's research and development department: H BARCLAY MORLEY, STEPHEN M CREIGHTON, EDWIN DORFMAN, and BASHKIM MERLIKE. Mr Merlike has been transferred from the works laboratory.

FRED W NOECHEL has been named to head the Textile Fibers Application Laboratory of National Aniline Division, Allied Chemical & Dye Corporation. In his new position, Mr Noechel will be responsible for textile-processing techniques relating to the use of Allied Chemical's nylon-type fiber soon to be produced at their $25,000,000 synthetic fibers plant now under construction at Hopewell, Virginia.

D D Gagliardi

DONALD D GAGLIARDI has announced his resignation as research director of Warwick Chemical Co and has opened an independent, personally sponsored consulting office and research laboratory for the chemical, textile and coating industries at 157 Main St, East Greenwich, R I.

Mr Gagliardi served for approximately three years as research director and director of new product development at Warwick. Previous to that time, he had been employed for five years as group leader of Rohm & Haas Company's Textile Research Laboratory.

C Taggart

CLARENCE TAGGART has been elected a vice president of the Riegel Textile Corporation. He will continue as manager of the Cotton Finished Goods Department, a position he has held since he joined the company in 1948.

JAMES BECKETT has been elected executive vice president of Interchemical Corporation. CHARLES W SCOTT will succeed Mr Beckett as divisional president of Interchemical's Finishes Division.

Mr Beckett joined Interchemical in 1929 as manager of its Chicago printing ink factory. Mr Scott has been with Interchemical since 1940.

JAMES O ARONSON on January 4th was elected vice president of the United Aniline Company, Boston, Mass.

H S Shultz

HERBERT S SHULTZ has been appointed industrial engineer at Wyandotte Chemicals Corporation, Wyandotte, Michigan.

A veteran of 13 years with Wyandotte, Mr Shultz has been a member of the technical service department of the Michigan Alkali Division since 1948.

In his new position Mr Shultz will act in the capacity of a technical service representative to Wyandotte's manufacturing division . . . his main responsibilities will be to develop improved material handling procedures, study cost standards and make recommendations concerning packages and packaging operations.

J M WELDON has been transferred to the General Sales Department of The International Nickel Company, Inc, as assistant to the vice-president.

In other appointments, C J BIANOWICZ has been named manager of the Inco Nickel Alloys Department, and DANIEL W MACHON has been placed in charge of the newly established Cobalt Section of the Nickel Sales Department.

Mr Weldon, in his new position, will deal principally with the company's mill and foundry products. Associated with International Nickel since 1927, he has held various assignments in the sales, executive and other departments.

Mr Bianowicz, who succeeds the late H D TIETZ, previously was in charge of the I N A Department's industrial sales. He joined International Nickel in 1928 as a salesman in the department he now heads, and last August 1 completed 25 years' service with the company.

Mr Machon joined International Nickel in 1949 as a representative abroad, serving in this capacity until March 1, 1952, when he returned to New York. He was in the Secretary's Office prior to his present appointment.

RALPH WHITAKER, president, Fred Whitaker Company, Philadelphia, has been elected to the Board of Trustees of the Philadelphia Textile Institute.

Mr Whitaker has been the active head of this company since 1917.

W J Miller

K L Briggs

J T Gibbons

CATALIN CORPORATION OF AMERICA, New York, has announced the election of two new vice presidents effective January 1, 1954.

WILLIAM J MILLER, associated with Catalin for the past thirteen years, has been appointed vice president in charge of engineering at the company's Fords, N J, Calumet City, Ill and Thomasville, N C, plants.

KENDAL L BRIGGS has been appointed vice president in charge of production at the company's three plants. Previous to Mr Briggs' appointment as vice president, he was, for two years, general plant manager at the Fords, N J, plant.

THE Board of Directors of The Absorbent Cotton Company, Valley Park, Mo, recently announced the appointment of JOHN T GIBBONS as president of the company.

Mr Gibbons joined The Absorbent Cotton Company as Executive Vice President in 1941.

F L Murphy

FRANK L MURPHY has been appointed the new Pacific Coast Division manager for National Starch Products Inc.

Mr Murphy began his career with National at the Plainfield, N J plant in 1940. His most recent position was that of assistant manager, Mid-Atlantic Division.

AO ZOSS has been appointed technical director and CHRIS C SCHULZE has been named production manager of the Linden plant of General Aniline & Film Corporation.

Formerly production manager, Dr Zoss in his new post is responsible for production, engineering, process development and process engineering functions. Dr Schulze had been assistant manager of the Process Development department prior to assuming responsibility for all production at Linden.

L L GARBER, vice president, H K Porter Company, Inc, Pittsburgh, has been elected a director, vice president and general manager of The Alloy Metal Wire Company, Prospect Park, Pa, the newly acquired division of H K Porter Company, Inc.

Mr Garber, formerly general manager of Porter's Hinderliter Tool Company Division, has been with the Company four years serving in various management and production capacities.

NEWS from Kenwood Mills (F C Huyck & Sons), Rensselaer, N Y, concerns the election of EARL D RHODES to the post of vice president and the appointment of WILHELM MOE as general superintendent of the Rensselaer plant.

Mr Rhodes' election took place at a recent meeting of the Company's Board of Directors. He has been with the firm since 1924. In November, 1944 he became general superintendent of the entire Rensselaer mill, and has served in that capacity up to this time. Mr Moe has served as assistant superintendent since 1943.

BR SARCHET, manager of the Kobuta, Pa, chemical plant of Koppers Company, Inc since 1951, has been named assistant sales manager of Koppers Chemical Division.

Mr Sarchet succeeds JOHN W POOL, JR, who has been named manager of the Sales Development Section of Koppers Central Staff Sales Department. Both will have their headquarters in Pittsburgh.

Replacing Mr Sarchet as manager of the Kobuta Plant will be FRANK R GARNER, who has been assistant plant manager since 1949.

E S Rudnick

EDWARD S RUDNICK, director of research of Wamsutta Mills, has been elected an Associate of the (British) Textile Institute. During the last five years, Mr Rudnick has published and delivered several papers in the field of quality control in connection with his work at Wamsutta Mills.

AG ASHCROFT, vice president and director of research and development, Alexander Smith, Inc, is to receive the Harold De Witt Smith Memorial Medal for 1954. This is the Fifth Award of the Medal by Committee D-13 on Textile Materials, of the American Society for Testing Materials.

The medal will be presented to Mr Ashcroft at a luncheon in his honor on March 18 during the spring meeting of Committee D-13, March 17 to 19, at the Statler Hotel, New York City.

ERNEST THORNTON, director and plant manager of Peerless Color Company, Inc, Plainfield, N J, has resigned. Mr Thornton will shortly announce his future plans.

of The
, Valley
the ap-
ONS as

bsorbent
ice Pres-

ctor of
as been
British)
ast five
ed and
field of
ith his

ent and
develop-
receive
emorial
Award
-13 on
Society

to Mr
nor on
ting of
at the

or and
Color
has re-
tly an-

, 1954